

**RIO LINDA/ELVERTA POWER PROJECT
RESPONSES TO
CALIFORNIA ENERGY COMMISSION DATA REQUESTS
(through May 15, 2001)
(01-AFC-1)**

TECHNICAL AREA: Biological Resources

ISSUE: *With staff's knowledge, the applicant provided, in the Rio Linda/Elverta Power Project AFC, biological resource field survey information for the project site and linear facilities that was generated for the Sacramento Ethanol and Power Cogeneration Project (SEPCO) Project (92-AFC-2) in the early 1990s. The two projects share the same proposed power plant site. During pre-filing meetings, staff expressed concern that current field survey information will be needed to complete staff's biological resource analysis. To address this concern, the applicant agreed to complete spring 2001 biological resources field surveys and provide the survey results to the Energy Commission as soon as the field surveys are completed.*

Data Request #1: Please provide complete field survey information (including updated project site and all linear facilities/sensitive species maps), and a description of how all the surveys were completed, for the spring 2001 biological resources surveys of the proposed Rio Linda/Elverta Power Project (RLEPP). (This includes the project site and all off-site project activities.)

Response: Spring biological field survey results are provided in Attachment #1.

Data Request #2: Please combine the spring 2001 survey information with the biological resource information and maps already provided (as part of the March 2001 Data Adequacy Supplement) for the proposed cooling water pipeline routes.

Response: Please refer to Response to Data Request #1.

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TECHNICAL AREA: Cultural Resources

ISSUE: *It is unclear whether the route of the new access road to be built from Elverta Road to the power plant site has been surveyed. It is also unclear whether all of the route of the new water pipeline referred to on page 3-28 of the AFC has been surveyed. Additional information is needed to complete the staff analysis.*

Data Request #3: Please provide a map (1:24000) showing the relationship of the new access road route to the natural gas pipeline route. If these two routes are not the same, please provide a cultural resource survey report for the unsurveyed portions of the access road route. If the two routes are the same, please state so.

Response: The two routes are the same. AFC Figure 5.7-1A (scale 1:24,000) illustrates the relationship of the natural gas pipeline to the new access road (Sorento Road extension). AFC Figure 3.3-1 (scale 1:3,600) also provides an illustration of the relationship of the pipeline and road extension. As noted in AFC Table 3.7-4, the pipeline will be within 10 feet of the road shoulder.

Data Request #4: Please provide a map (1:24000) showing the relationship of the new water pipeline route to the area surveyed for the power plant site. If the water pipeline route extends outside the power plant survey area, please provide a cultural resources survey report for the unsurveyed portions of the water pipeline route. If the two routes are the same, please state so.

Response: The water supply pipeline to be constructed by RL/ECWD was not surveyed for the AFC. The water supply pipeline routes on West 6th Street and U Street were surveyed for cultural resources on June 12, 2001, by Douglas Davy and Scott Davis. Dr. Davy holds a Ph.D. degree in archaeology and has 20 years of experience in archaeology and cultural resources management. Mr. Davis holds a Bachelor's degree in Anthropology and has 9 years of experience conducting archaeological field studies.

The water supply pipeline right-of-way included two segments as illustrated in the map provided by the Applicant in Response to Data Adequacy Comments #3 through 6 (Figure 1, in the Data Adequacy Response). One of these runs due west from the corner of U Street and 6th Street to a well site near the intersection of U Street and Elwyn Avenue, approximately 2,900 feet (884 meters). The pipeline would be within the U Street road right-of-way. The survey team walked along the edge of U Street, examining cut banks to the roadway, rodent burrow dirt piles, and dirt exposures in pastures adjacent to the road for evidence of archaeological deposits.

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The second segment runs from the corner of U Street and 6th Street south. At Straugh Road, the route continues due south, departing from 6th Street-Marysville Boulevard, which bends south-southeast south of this point, across pasture land, to a well site just north of M Street. The total distance surveyed was approximately 5,100 linear feet (1,554.5 meters). Along the road right-of-way, one survey team member surveyed a given side of the roadway. In the pasture segment between M Street and Straugh Road, the surveyors were spaced approximately 15 meters apart, for a total survey width of 30 meters (approximately 100 feet).

Ground visibility throughout the survey was fair to good. Ground surface was visible in road cut banks, rodent burrows, and other ground disturbances along the road. The pasture area south of Straugh Road had recently been disked and thus afforded excellent visibility. Miscellaneous refuse was observed along much of the route, including mostly recent bottle glass.

Data Request #5: For all cultural resources identified please provide copies of the completed DPR 523 forms.

Response: There were no cultural resources identified during survey of the water supply pipeline route.

Data Request #6: For any cultural resources that can not be avoided, please provide a discussion of the significance of the resources under CEQA Guidelines (Cal. Code Regs., Title 14, Section 15064.5, (a), (3), (A)(B)(C) & (D)) and provide staff with a copy of the assessment and the specialist's conclusions regarding significance.

Response: There are no cultural resources located along the water supply route.

ISSUE: *In the discussion of the results of the architectural reconnaissance on page 5.16-9 of the AFC, it is concluded that the power plant site cannot be seen from the Charles Seidel home and the house on Straugh Road (no house number) and that, therefore, there would be no effects on the integrity of setting for these properties, even if they were found to be eligible for the California Register of Historical Resources (CRHR). It is also concluded that, although the power plant would become a significant part of the viewshed from the John Risse home (7424 6th Street), the house lacks architectural integrity and is not significant (eligible for the CRHR). Staff needs additional information to verify these conclusions.*

Data Request #7: Please provide photographs of the views toward the power plant site from the Charles Seidel home and the house on Straugh Road. Also please provide photographs of these two houses and their setting.

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Response: The attached photographs (see Attachment #7) demonstrate that the project would probably not be visible from the Charles Seidel home on Elverta Road (photograph shows the top of the radio transmitter tower located north of the project). In addition, the photographs show that the home has been partly demolished. The home would therefore not qualify as historic architecture.

The photographs also show that the house on Straugh Road has undergone very recent remodeling and that an entirely new front façade has been added. This home would therefore not qualify as historic architecture.

Data Request #8: Please provide photographs of the John Risse home that provide enough detail to illustrate its lack of architectural integrity. Also please provide photographs of the views toward the power plant site from the John Risse home.

Response: The photographs of the John Risse home (included with Attachment #7) show that the home lacks architectural integrity because the original front facade of the home, probably once a porch, has been enclosed (note the steps remaining on the southern outside wall). In addition, a modern deck has been added to the rear of the home, creating a new entrance. This home would therefore not qualify as historic architecture. Photographs towards the power plant from this home show that the view is substantially blocked by plantings around the home.

ISSUE: *The AFC states on page 5.16-13 that CA-SAC-488H is a historic period archaeological site located where a structure is shown on a 1937 map and that the site may be impacted by trenching for the natural gas pipeline or by the bore pit and staging for the bore under the Sacramento River. It is also concluded in the AFC that CA-SAC-488H is not significant as an archaeological site (not eligible under California Register Criterion D) because "it lacks domestic refuse or any indication of a refuse dumping area on site that could be a source of artifacts for analysis." Staff needs additional information to verify these conclusions.*

Data Request #9: Please provide a discussion of the steps taken to verify that no subsurface domestic refuse deposits are present at the site.

Response: PG&E has indicated the bore pit and staging for the bore under the Sacramento River will be in a cultivated field approximately 200 feet north of the dirt road, pumping station, and canal that are adjacent to the Sacramento River. At this location, the pipeline and staging area will not be within the boundary of CA-SAC-488H (see maps of site CA-SAC-488H included within the confidential filing submitted as AFC Appendix L-1).

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Data Request #10: Please identify the presence or absence of subsurface deposits and complete the evaluation efforts under CEQA Guidelines (Cal. Code Regs. tit. 14, Section 15064.5, (a), (3), (A)(B)(C) & (D)).

Response: Please see Response to Data Request #9.

ISSUE: *The AFC states on page 5.16-8 that approximately 4 miles of the natural gas pipeline route could not be surveyed because the landowner denied access. Staff needs additional information to determine whether the property can not be surveyed at this time.*

Data Request #11: Please provide a cultural resources survey of this portion of the natural gas pipeline route. For all cultural resources identified please provide copies of the completed DPR 523 forms. For any cultural resources that can not be avoided, please provide a discussion of the significance of the resources under CEQA Guidelines (Cal. Code Regs., tit. 14 Section 15064.5, (a), (3), (A)(B)(C) & (D)) and provide staff with a copy of the assessment and the specialist's conclusions regarding significance.

Response: Property owners in the study area were notified by PG&E with letters dated April 20, 2001 and May 1, 2001 of the need to enter lands for study purposes. The letters addressed studies in general including cultural, biological, engineering survey and routing, real estate appraisal, etc.

Denied access will be handled on an individual basis with letters advising the property owner of PG&E's legal right to enter by virtue of Code of Civil procedure Section 1245.010. Should the property owner persist with denied access, a Court Order will be sought by PG&E. The process to obtain access via Court Order may take from 15 to 20 days depending upon the situation. The omitted surveys will be completed soon after a Court Order is obtained to gain entry upon the property.

When access is obtained, cultural resource surveys will be completed and the required forms and assessments will be provided to the CEC (see also AFC Section 5.16.3 Mitigation Measures, Archaeological Survey of Unsurveyed Areas Along Natural Gas Pipeline).

Data Request #12: If access to the property is still denied, please indicate the steps you are taking to gain access and an anticipated date that access will be granted and the surveys completed.

Response: Please see Response to Data Request #11.

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ISSUE: *The AFC states on page 5.16-14 that the Hedge-Proctor Transmission Upgrade will not affect any cultural resources. Staff needs additional information to determine whether all potential impacts have been considered.*

Data Request #13: Please provide maps (1:24000) showing all cultural resources in relation to potential impacts that could result from the transmission line upgrade, including new tower locations, areas where transmission lines will be pulled from vehicles, staging areas, and construction access roads. Please identify potential impacts to cultural resources and the efforts that will be taken to ensure that the resources are avoided.

Response: AFC Figure 1E (in Confidential Appendix L-1) is a map (1:24,000) showing all cultural resources within ¼ mile of the transmission line upgrade.

As noted on AFC page 5.16-14, there are two historic archaeological sites located near (within 200 feet) of the Hedge-Proctor Transmission route. These consist of historic refuse, including structural refuse. The transmission line passes about 200 feet from one of these sites (Garcia and Associates Resource #3). This site consists of concrete pads and bulldozed mounds of earth. Inspection of the 1950 USGS 7.5-minute USGS Carmichael quadrangle indicates buildings at this location. Refuse near the site, however, appears to be more recent than 50 years. The project would avoid this site, therefore there would be no impacts to this site.

The second site (Garcia and Associates Resource #16), at 9197 Elder Creek Road includes a modern residential structure in addition to 1929 structures including a barn, milk barn, and a small shed. The transmission line runs about 75 feet from this site, but upgrading the transmission line would not affect it. The transmission pole structures would be at the same location as the present transmission towers and there would be no impacts to this site.

Two additional sites (Garcia and Associates Resources #s 2 and 4) are located further than 200 feet, but less than one quarter-mile, from the transmission line route. Resource #2 is a historic-era foundation with associated refuse about 1000 feet from the transmission line. Resource #4 is a water tank and irrigation system about 600 feet away. These sites would be avoided, therefore there would be no impact.

The project APE crosses the Central California Traction Railroad track along Florin Road. Upgrading the transmission line would have no effect on this feature.

Potential impacts to all these resources are summarized in AFC Tables 5.16-2 and 5.16-3. Efforts that will be taken to ensure that resources are avoided are described in AFC Section 5.16.3 Mitigation Measures.

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ISSUE: *The discussion of cumulative impacts in the AFC does not provide any information on other projects in the area that could impact cultural resources. The discussion of cumulative impacts should consider such other projects. Additional information is needed to complete the staff analysis.*

Data Request #14: Please provide a discussion of other projects within a one mile radius of the Rio Linda Power Plant project that will involve ground disturbance and have the potential to impact cultural resources.

Response: Discussions with Sacramento County Planning and Public Works Department (Jane Petri, personal communication, June 3, 2001) indicate there are no other projects within one mile of the RLEPP that involve ground disturbance and have the potential to impact cultural resources.

As noted in AFC Section 5.16.5 Cumulative Impacts, RLEPP will preserve and avoid known cultural resource sites and mitigation measures have been identified that reduce the potential for impacts during construction to a level of insignificance. RLEPP will not cause or contribute to cumulative impacts to cultural resources.

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TECHNICAL AREA: Geology

ISSUE: *On March 2, 2001, the California Energy Commission received a letter (hard copy attached) from the California Division of Mines and Geology (CDMG) presenting its comments on the proposed project's presentation of engineering geology and seismology information in the Rio Linda/Elverta Power Project Application for Certification (AFC). The letter from the CDMG pointed out that the GeoCon report included in Appendix "G" of the AFC is out of date. The GeoCon report (page 23) states that the report was valid when it was finalized (June 1992) and that the findings and recommendations should not be relied upon after a period of three (3) years. Furthermore, the project itself has changed from an ethanol production facility to a 560MW combined cycle natural gas-fired power plant. The GeoCon report from 1992, while a source of some background information, is not considered valid because more than three years have elapsed since it was prepared and the project has changed. For example since the GeoCon report was produced, the protocol for performing a liquefaction hazards analysis has been updated. The liquefaction potential discussion in the GeoCon report is not appropriate or adequate with respect to current liquefaction analysis.*

Data Request #15: Please provide an updated Geologic Hazards and Resources section of the AFC to address each of the CDMG's comments presented in the CDMG's letter addressed to Mr. Lance Shaw of the CEC dated March 2, 2001.

Response: A new Engineering Geological Report will be provided prior to certification as noted in Response to Data Request #16, below, and will address each of the CDMG's comments presented in the CDMG's letter addressed to Mr. Lance Shaw of the CEC dated March 2, 2001. When the Engineering Geological Report is available, the Geologic Hazards and Resources section of the AFC to address each of the CDMG's comments

ISSUE: *The Engineering Geologic Report required under the 1997 edition of the Uniform Building Code (UBC) section 3309.4 is to be prepared for the project prior to the submittal of the grading plan to the Chief Building Official delegate. Along with the grading plan submittal, the updated site specific liquefaction analysis is required under 1804.5 since the project site may be in an area susceptible to liquefaction.*

Data Request #16: Please provide the required Current Engineering Geological Report pursuant to the codes referenced above, prior to certification.

Response: The Engineering Geological Report will be provided prior to certification.

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TECHNICAL AREA: Hazardous Materials Management

ISSUE: *Additional information is needed on the identity and toxicity of hazardous materials proposed for use at the Rio Linda Rio Linda / Elverta Power Project. To assess the potential for any potential impacts associated with accidental hazardous materials releases, it is necessary to know the specific identity and quantity of each chemical to be used at the facility.*

It is also necessary to conduct site-specific modeling of down wind concentrations of these chemicals should an accidental release occur. The applicant must conduct the required analysis because it incorporates information regarding specific design elements of the facility.

Data Request #17: Table 5.12-1 indicates the use of undefined “Boiler Water Treatment Chemicals”. Please provide a description of the specific chemicals to be used and the quantity of each proposed to be stored on site.

Response: A description of the boiler water treatment chemicals is provided in the following table.

Material	Application	Amount Stored On-Site ⁽²⁾	Phase	CAS Number	Hazards ⁽³⁾	CalARP Threshold Quantity, Pounds
Alkaline Phosphate Solution ⁽⁵⁾	Boiler Feedwater Scale Control	250 US gal, tote containers / 30 days storage	Liquid	1310-73-2 7758-29-4	Acute, Chronic	
Carbohydrazine ⁽⁴⁾	Boiler Feedwater Corrosion Control (Oxygen Scavenger)	250 US gal, tote containers / 30 days storage	Liquid	140-22-7	Acute, Chronic	
Sodium Hydroxide, 50% Solution	Boiler Feedwater Corrosion Control	5 gallons	Liquid	1310-73-2	Acute, Chronic, Reactive	
Aqueous Ammonia, 19.0 wt%	Boiler Feedwater Corrosion Control	250 US gal, tote containers / 30 days storage	Liquid	7664-41-7	Acute, Chronic, Fire, Pressure	500 lb

Notes:

1. All quantities are approximate.
2. Chemicals are pre-mixed in portable containers; quantities shown are for BFW application only.
3. Hazards categories are defined by 40 CFR 370.2. Health hazards include acute (immediate) and chronic (delayed). Physical categories include fire, sudden release of pressure and reactive.
4. These chemicals are commonly used as stated. Similar chemicals could be substituted, which do not cause significantly greater risks.
5. Nalco BT-4000 or equivalent, CAS numbers shown are for components Sodium Hydroxide and Sodium Tripolyphosphate respectively.

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Data Request #18: Please provide accidental release modeling as described in Section 5.12.2.2 of the Application for Certification.

Response: Accidental release modeling is provided in Attachment #18.

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TECHNICAL AREA: Land Use

ISSUE: *On page 3-1 of the AFC, under section 3.2 Location of Facilities it states that the proposed project is to be located on four parcels identified as Assessor's Parcel Numbers 202-000-030, 031, 032, and 033 totaling 90 acres.*

Assessor's parcels are not legal land division parcels. Assessor's parcels are generated by a County Assessor's Office as a means of placing a value on property or portion thereof for the purpose of property taxation in accordance to the California Revenue and Taxation Code. The County Assessor does not divide or create parcels of land in conducting this process. The assignment of an Assessor's Parcel Number to a property provides a convenient and quick location reference for the County Assessor to identify a property on the property assessment roll within a County. Legal land division parcels are established in accordance to the procedures and the requirements set forth in the State Subdivision Map Act (Government Code section 66410 – 66499.58).

The status and number of legal parcels of record for this project is unknown based on the current information provided in the AFC?

Data Request #19:

- a. Please describe the legal status of the land on which the project is to be built.

Response: The land on which the project is to be built is made up of four legal parcels described as follows:

Parcels A, B, C, and D inclusive, as shown on that certain "Parcel Map" recorded in Book 80 of Parcel Maps, at Page 37, records of the County of Sacramento.

- b. Please explain whether the applicant is going to be required to file a parcel map with the County of Sacramento to create the parcel(s).

Response: The Applicant will not create any new parcels of land requiring the filing of a parcel map. The Applicant controls all of the four legal parcels.

- c. If not, explain the land division procedure used to create the parcel(s) totaling 90 acres.

Response: The four parcels were created through a parcel map as stated in 19 a above.

- d. Does the applicant have four legal parcels or some other number of parcels?

Response: The Applicant has four legal parcels.

- e. Provide a copy of the recorded final map, lot line adjustment map, or Certificate of Compliance for the property(ies).

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Response: Please see attached. A copy of Sacramento County Assessor's Parcel Map 202-090 is attached.

Data Request #20: The power generation facility is to be contained on a 55 acre portion of the 90 acre property. Is the proposed power plant to be constructed on a single legal parcel of land?

Response: The proposed power plant will be constructed on four legal parcels. The reference on Section 3.3 page 3-1 to 55 acres is a description of the portion of the 90 acre site that will be cut and filled to provide a level area for the power generation facility, switchyard, and construction laydown areas at an elevation of 40 feet amsl. It is not intended to suggest that a new 55 acre parcel will be created for the power generation facility.

ISSUE: *The County of Sacramento's zone designation for the property (M-2, Heavy Industrial and M-2 (F) Heavy Industrial-Flood Combining) does not expressly state that natural gas power generation facilities are permitted within these zones. As stated in the AFC, the Planning Director for Sacramento County made an administrative determination that the proposed use is appropriate due to its similarity to uses presented in the County's M-2 Zone which includes public utility and public service facility as an allowed use (AFC page 5.7-14 -15).*

Data Request #21: Please provide a copy of the Planning Director's written administrative determination stating that the use of subject property as a power generation facility is consistent within the County's general plan policies and zoning.

Response: Please refer to Attachment #21.

ISSUE: *As stated in the AFC (AFC, page 5.7-15) the County of Sacramento has a maximum height requirement for structures of 100 feet. Additionally, the AFC states that a height may be increased to 150 feet when the Planning Commission or the Board of Supervisors reviews development plans. The exhaust stacks for the facility are going to be 150 feet. Therefore, a height review action by the County would be required.*

Data Request #22: Please provide information regarding the status of a development review by the County of Sacramento, a copy of its "findings" and any concerns or suggested conditions of approval that most likely would be attached to the development review had it been processed by the County.

Response: Section 301-22 of the Zoning Ordinance provides that structures of up to 150 feet may be allowed in an industrial land use zone, provided that all buildings are set back from the ultimate right-of-way line of all abutting streets and freeways a distance at least equal to the height of the building. The stacks will not exceed the 150 foot maximum allowed under

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Sections 301-22 and 325-04(b) of the Zoning Ordinance, and the plant will be set back from all abutting streets at least 150 feet. The County has concluded that no further land use entitlement is required for the RLEPP, although it has requested to participate in the CEC process (letter dated June 5, 2001 from Tricia Stevens, Principal Planner, to Lance Shaw, Project Manager).

ISSUE: *A minor conditional use permit is required in Yolo County for the installation of transmission pipelines within the County's A-P and A-I Zone designations.*

Data Request #23:

- a. Please provide information regarding the status of the project's consistency review by the County of Yolo for consistency with its policies and zone regulations.
- b. Provide a copy of the "findings" for the granting of a minor use permit and any conditions of approval that most likely would be attached to the minor use permit had it been processed by the County.

Response: According to David Daly, Senior Planner, Yolo County Planning Department, a minor use permit is not required for the proposed project, however an encroachment permit will be required for the natural gas pipeline that is constructed within County public right-of-way areas (see letter from Yolo County to CEC c/o Lance Shaw dated 2/28/01). Standard County encroachment permit conditions imposed on pipeline construction within county streets include: traffic control requirements, compaction requirements (90% using native backfill or slurry backfill if native material is not used) and surface patch requirements (per Jim Campbell, Yolo County Engineering Division). These are the conditions of approval that most likely would be attached to the encroachment permit when processed by the County.

ISSUE: *The AFC (page 5.7-14) identifies that no discretionary project(s) have been approved within the past 18 months in the vicinity of the proposed project. The last discretionary project to have been approved within the area involves the Sacramento Ethanol and Power Cogeneration Project (SEPCO) power plant and Zoning Agreement No. 940749, dated February 1, 1995. As this is the only discretionary project noted it is not clear to staff if this project represents the last and most recent discretionary action to occur within the vicinity of the current project.*

Data Request #24: Please clarify if the SEPCO power plant is the most recent discretionary action to have occurred. Have any other discretionary actions occurred within a mile radius of the perimeter of the project during the past 18 months?

Response: Jane Petri, Sacramento County Planning Department (personal communication with M. Dos Santos, June 3, 2001), reviewed all parcels within a one-mile radius of the

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perimeter of site and found that one discretionary action had occurred since June 1999, and currently one action was pending approval by the Sacramento County Board of Supervisors. On June 12, 1999, APN 206-0130-090, a nine-acre lot was split into three lots. On June 20, 2001 a proposal to attach a cellular panel to an existing structure on APN 202-0090-029 will be heard by the County.

Data Request #25: Discuss any proposed planned land uses changes and future development projects within a 1 mile radius of the perimeter of the subject property.

Response: Jane Petri, Sacramento County Planning Department (personal communication with M. Dos Santos, June 3, 2001), indicated there are currently no planned land use changes or future development projects within a one-mile radius of the perimeter of the site.

ISSUE: *AFC page 5.7-14 – 15 states that the County has determined that the proposed project will be consistent with a previous zoning agreement (Zoning Agreement No. 940749) provided that 5 conditions are applied to the project. Condition 5 pertains to the dedication of a multi-use trail easement to the Rio Linda/Elverta Parks District.*

Data Request #26: Show the location of the multi-use trail easement to be granted to the Rio Linda/Elverta Parks District.

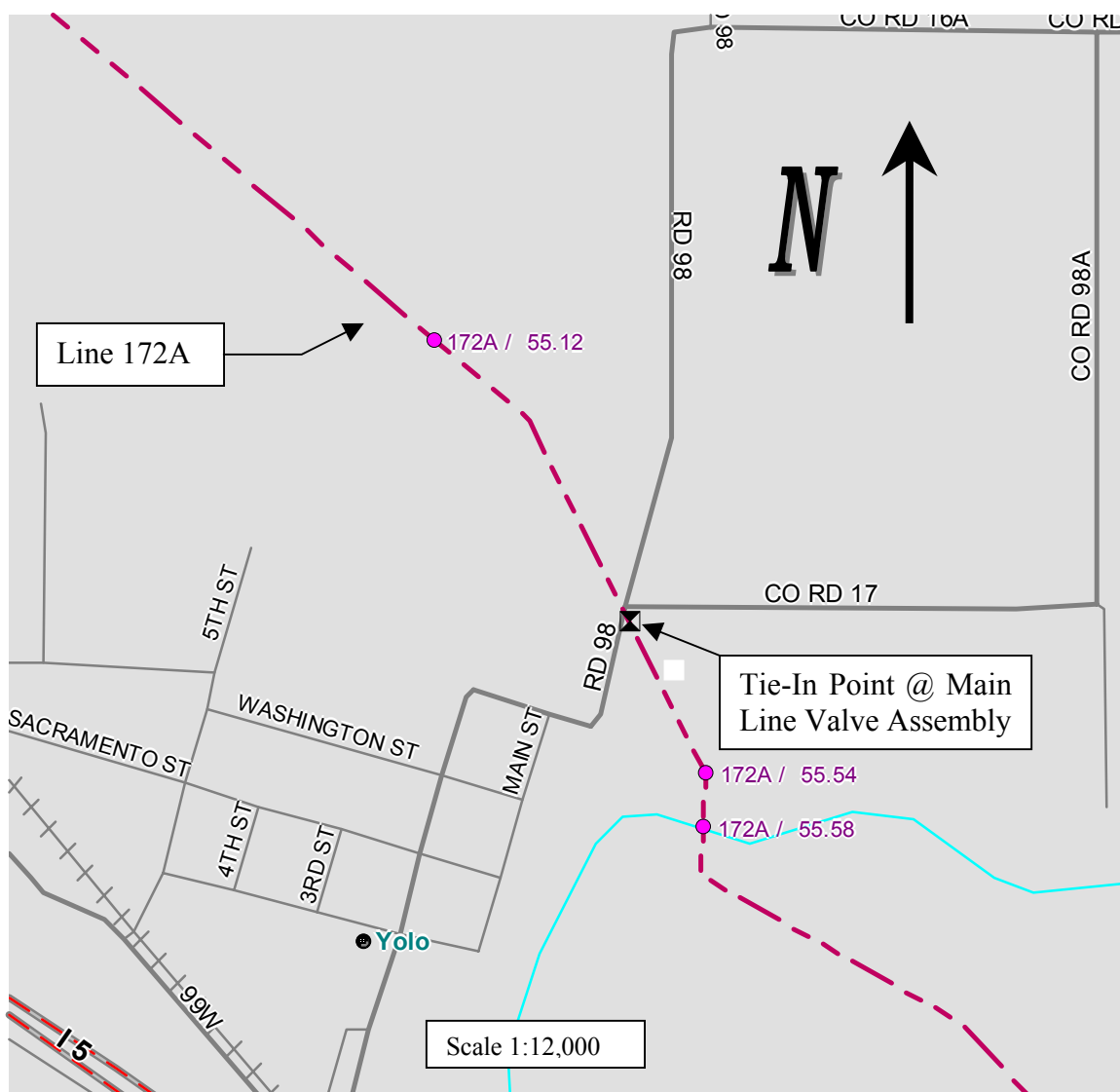
Response: The location of the multi-use trail leading to the Natomas East Main Drainage Canal will be determined after consultation with the Rio Linda Elverta Parks District as to the appropriate location of the trail, as required under Zoning Agreement 940749.

ISSUE: *AFC page 1-3, 5.7-1 and Figure 5.7-1D, etc. indicate that the proposed 20 mile natural gas pipeline will connect into an existing pipeline near the Town of Yolo in the County of Yolo. The AFC states that the applicant proposes to tie into PG&E's main north/south pipeline. However, the specific location of PG&E's main north/south is not shown on a map in the AFC.*

Data Request #27: Show on a separate map or Figure 5.7-1D the specific location of the PG&E main north/south natural gas pipeline and the location of the pipeline interconnection to serve the Rio Linda/Elverta Power Project.

Response: The natural gas pipeline connection point on PG&E Pipeline No. 172 is illustrated on the attached map.

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Data Request #28: Show on the connection location on a current map, and provide a letter from PG&E confirming that it will serve this project.

Response: Please refer to Response to Data Request #27 for map illustrating connection point. The following statement is PG&E's response regarding service to this project.

"Pacific Gas and Electric Company (PG&E) has received a request from FPL Energy Sacramento Power, LLC (Applicant) for a gas service connection to Applicant's proposed Rio Linda Power Plant located on U Street and West 66th Street in Rio Linda, Sacramento County. PG&E is proceeding to respond to the request for service under its gas tariffs currently on file with the California Public Utilities Commission."

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TECHNICAL AREA: Noise

ISSUE: *The Energy Commission typically assesses compliance with the 5 dB noise level increase criterion by comparison of the steady state noise level due to the power plant to the average (or typical) L90 values obtained during nighttime hours, as noted by the applicant. Sacramento County applies an absolute criterion in terms of the median (L50) project noise level, and the ambient noise level may be considered as a factor in adjusting the noise standard. The applicant has summarized the 24-hour cumulative noise level values collected in the long-term noise measurement periods in Table 5.9-1, and in the text of the AFC. The applicant has also provided graphs of the hourly data. However, the hourly noise level values were not provided.*

Data Request #29: Please provide the hourly Leq, L50, and L90 values for noise measurement sites 1 through 4 in tabular format.

Response: Hourly Leq, L50, and L90 values for noise measurement sites 1 through 4 are provided in the following table.

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Hour	Location 1				Location 2				Location 3				Location 4			
	Leq	L10	L50	L90	Leq	L10	L50	L90	Leq	L10	L50	L90	Leq	L10	L50	L90
14	58.0	56.0	50.0	46.5	67.0	43.5	34.5	30.5	78.5	58.0	38.5	34.0	51.0	46.5	41.5	39.0
15	58.0	53.0	49.0	46.0	57.0	42.5	35.0	30.0	62.0	62.0	39.0	33.5	60.0	44.5	40.5	38.0
16	58.5	55.5	48.5	45.0	69.0	46.5	38.5	32.5	65.5	68.5	46.0	36.0	50.0	45.5	39.5	37.5
17	61.0	54.0	48.5	45.5	68.0	45.5	40.0	34.0	65.5	70.0	50.0	36.5	47.5	43.0	38.5	37.0
18	57.0	55.0	48.5	45.5	66.5	48.0	39.5	33.0	65.0	66.0	47.0	36.5	44.5	45.0	41.0	38.0
19	57.0	55.0	48.5	45.5	45.5	46.5	38.5	34.0	59.0	60.0	43.0	37.5	49.5	46.5	42.0	40.0
20	56.0	52.5	46.5	44.5	73.5	47.0	38.5	34.5	58.0	56.5	45.0	42.0	48.0	46.0	44.0	40.5
21	56.0	54.0	46.0	42.5	71.5	46.5	37.5	34.0	58.0	54.5	44.5	42.0	47.0	47.0	44.0	41.5
22	52.5	47.5	46.0	43.0	65.0	44.0	35.0	32.0	57.0	50.5	40.5	38.5	50.0	45.0	42.5	40.5
23	52.5	48.0	46.0	43.0	39.5	41.0	34.0	32.0	53.5	48.0	42.5	40.5	48.0	44.0	41.0	37.0
0	51.0	49.0	46.5	43.5	66.0	43.5	35.0	33.5	56.0	47.0	40.5	39.0	45.5	43.5	35.5	33.5
1	48.5	47.5	46.0	43.0	60.0	38.5	35.0	33.0	53.5	48.0	45.0	42.5	37.5	38.5	35.0	34.0
2	51.5	50.5	45.5	42.5	77.0	46.0	34.0	30.5	60.0	53.0	38.5	35.5	46.0	45.0	40.0	38.0
3	50.0	48.0	45.5	42.0	34.0	35.0	32.0	30.5	47.5	38.0	35.0	33.0	41.5	43.0	40.5	39.0
4	56.0	56.5	46.5	44.0	74.0	52.0	35.5	33.5	60.0	59.5	40.0	38.0	49.0	50.5	46.0	41.5
5	53.5	49.0	47.0	45.0	42.5	45.5	39.5	36.0	58.0	56.0	41.0	38.5	51.0	50.5	47.5	44.0
6	57.5	56.0	49.5	47.5	64.5	55.0	48.5	43.5	65.0	68.0	54.0	44.5	52.5	53.0	48.5	44.0
7	61.5	63.5	51.5	49.0	72.5	61.0	51.0	48.0	70.0	74.0	63.0	54.5	56.5	58.0	50.0	47.5
8	57.5	52.0	47.5	45.0	45.0	47.0	44.0	41.5	65.0	70.0	53.0	43.5	56.5	48.5	44.0	41.5
9	55.0	54.0	47.5	43.5	67.5	46.5	37.5	33.5	64.0	61.5	43.5	35.5	56.5	49.0	40.5	37.0
10	58.0	55.5	53.0	50.0	69.5	45.5	35.5	32.5	61.5	61.5	40.5	35.0	49.0	47.0	40.5	37.5
11	58.0	55.5	53.0	50.0	66.0	46.5	36.5	32.0	61.5	61.0	39.5	35.0	47.5	47.5	41.5	38.5
12	56.5	54.5	52.5	49.5	36.5	40.5	33.5	31.0	60.5	54.0	37.0	34.5	53.0	45.5	40.5	38.0
13	56.5	55.0	52.5	49.5	65.0	48.5	35.5	30.5	60.0	56.0	37.0	33.5	51.5	46.5	41.5	39.0
14	58.0	55.0	53.0	50.0	41.0	44.5	35.0	30.5	59.5	57.0	37.5	33.5	50.5	46.5	41.5	38.0
Leq(24)	56.8				68.9				66.7				52.2			
DNL	60.9				76.0				68.7				56.1			
CNEL	61.3				76.4				68.8				56.3			

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TECHNICAL AREA: Reliability

ISSUE: *The AFC for the Rio Linda/Elverta Power Plant Project (RLEPP) identifies the Western Area Power Administration (Western) as the transmission system that will take the power generated by the RLEPP. Western has indicated that the RLEPP's location will provide a number of special benefits to its transmission system, including reactive power support. However, the plant's future capacity factor is described as being dependent on market prices because it will to sell in the California Power Exchange. The plant's ancillary services (reactive power, regulation, and operating reserves, but not black start capability) will be sold to the California Independent System Operator. There is no discussion in the AFC if future power purchase arrangements might contain additional incentives in the form of rewards and penalties for RLEPP's operating availability and reliability. Such available/reliability incentives have commonly been included in Independent Power Producer (IPP) purchase contracts in various regions of the U.S.*

Data Request #30: Please indicate if any special incentives for high power plant availability and reliability might be included in future RLEPP purchase arrangements.

Response: While some preliminary discussions regarding power purchase agreements have taken place, no definitive agreements have been developed for the Project. Such agreements, should they exist in the future, may incorporate any number of special incentives, depending on the interests and needs of the power purchaser. This issue remains open at this time; as a merchant facility RLEPP may or may not enter power purchase agreements. Likewise the timing on development of such possible agreements is open: such agreements may not be developed until the plant is under construction or in commercial operation.

ISSUE: *Natural gas fuel for the Rio Linda/Elverta Power Plant Project (RLEPP) will be provided by PG&E through a new 16 to 20-inch 20-mile pipeline extension from PG&E's Line 172 near Yolo. The RLEPP AFC indicates that a PG&E Standard Facility Design 16 to 20-inch diameter transmission main can supply adequate gas volumes to the project site based an analysis of PG&E's gas transmission system under a variety of operating conditions. It is not clear if this gas transmission system analysis included future improvements to the PG&E system, e.g. added seasonal storage capacity, or what the probability of supply interruption by PG&E would be over the 30-year life of the RLEPP project.*

Data Request #31: Please identify what types of major improvements are planned for the PG&E gas transmission system, if any, that will be needed to provide a reliable supply of natural gas over the 30-year life of the project.

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Response: PG&E has identified several expansions to its backbone gas transmission system, which are included in the current Gas Accord II regulatory proceeding. These include a pipeline expansion of Line 401, expansion of the McDonald Island storage facility, and the installation of Line 57C to increase McDonald Island storage capabilities. None of these projects are required specifically for the RLEPP, although they all increase the supply reliability of the PG&E system. The installation of these projects is contingent upon the outcome of ongoing settlement proceedings.

PG&E has also identified several reinforcement projects for its Sacramento Valley Local Transmission System (SVLTS) to meet local core load growth under PG&E's Abnormal Peak Day (APD) design criteria. These include increasing the Maximum Allowable Operating Pressure (MAOP) of several existing pipelines and installing new pipelines. None of these planned projects are required specifically for the RLEPP, although they all increase the capacity of the local transmission system. The installation of these projects will proceed as planned whether the RLEPP is built, or not. If, and when, it becomes necessary, PG&E will install reinforcements specifically to maintain reliable service to the RLEPP in accordance with its filed tariffs.

Data Request #32: Please indicate if future gas supply interruptions of significant frequency and duration can be expected over the 30-year life of the project.

Response: Interruptions in supply could arise from the following conditions:

LOCAL CAPACITY CURTAILMENT

During periods of unusually cold weather, noncore customers may be required to curtail gas usage in order to ensure that local core demand is met. Local Curtailments may also be implemented when a pipeline has been damaged and supply deliveries are threatened. Local Curtailments are intended to reduce physical demand on the affected pipeline system.

Service to the RLEPP will be subject to Local Curtailments to the extent future winter weather conditions exceed Cold Winter Day (CWD) design conditions and cause local load to exceed the capacity of the SVLTS and/or damage occurs to the system such that curtailment is required to reduce demand on Line 172. Local capacity curtailments historically have occurred very infrequently and for only a few consecutive days at a time. PG&E is not aware of circumstances which would either substantially increase, or decrease, the frequency and duration of curtailments for the RLEPP and does not expect significant interruptions in gas service to the RLEPP.

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INVOLUNTARY DIVERSIONS

Involuntary Diversions may occur when supply destined for the core market is insufficient to meet the forecast demand, thereby threatening deliveries to core customers. Under Involuntary Diversions, Pacific Gas and Electric Company may divert noncore gas supplies to core customers in order to meet the forecast core demand. Emergency Flow Orders (EFO) are also in effect during Involuntary Diversions. Gas Rule 14 defines provisions for Involuntary Diversions.

Data Request #33: Does the filing for Chapter 11 bankruptcy protection affect PG&E's ability to supply gas for this project?

Response: No, the court is allowing business to continue, with oversight.

ISSUE: *Major equipment, including the two gas turbines and the single steam turbine will be enclosed inside a turbine hall. Repairs and maintenance may require heavy lifting gear. Such lifting gear could be permanently included in the turbine hall or could be portable cranes, if there is adequate access to the equipment in the turbine hall.*

Data Request #34: Please indicate how the RLEPP will provide for the lifting and moving of heavy equipment enclosed within the turbine hall, especially the turbine rotors.

Response: The lifting and moving of heavy equipment (gas and steam turbines, and gas compressors) and their components will be accomplished with a turbine hall bridge crane.

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TECHNICAL AREA: Traffic and Transportation

ISSUE: *The AFC discusses the linear facilities (natural gas fuel line and a water supply line), but no information is given on the construction schedule and how the workforce transportation and parking will be handled.*

Data Request #35: Please provide the following information for the linears:

- a. The construction schedule associated with each linear.
- b. A monthly breakdown of the construction workforce schedule for each linear.
- c. A monthly schedule indicating truck deliveries for equipment, materials and supplies for linear construction.
- d. The areas that will be used in linear construction activities for workforce parking and the laydown of equipment and supplies.

Response:

NATURAL GAS PIPELINE

Construction activities associated with the natural gas pipeline are proposed to begin March or April, 2002, with completion of pipeline construction in August or September, 2002. Right of way restoration, reconditioning and seeding are scheduled from September of 2002 to April of 2003. Actual schedules may vary as the project scope becomes further defined.

Although not presently determined, it is envisioned that the pipeline contractor will construct the pipeline in at least three spreads, two pipeline spreads with a separate boring crew comprising a third spread. A spread will consist of equipment adequately staffed to handle various types of construction activities for a given pipeline segment. AFC Table 3.7-3 describes pipeline construction workforce by month. The pipeline contractor upon award will determine ultimate construction workforce.

After a contractor has been selected they will determine a probable schedule for pipe delivery. This schedule will be adjusted on a weekly basis throughout the project, in accordance with the contractor's progress.

Work laydown areas and contractor's yard will be limited to the pipeline easement, including working strip, as well as negotiated land use with individual property owners. After a Contractor has been selected exact locations and their associated spatial requirements will be finalized.

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WATER PIPELINE

Only about 4,000 feet of water pipeline will need to be constructed within road right-of-way to support the project. RL/ECWD may construct this pipeline in conjunction with other planned system improvements, however construction of the segments on West 6th and U Street could be supported from the construction/laydown area on the project site. Construction of these short pipeline sections is expected to require 2-3 months.

A construction traffic plan will be prepared for approval by the Sacramento County Technical Services Division. The relatively small construction crew and limited equipment are not expected to have a significant impact.

ISSUE: *The pipeline construction activities for the natural gas fuel line and the water supply line will result in work being done in roadway rights-of-way. The proposed routes are on narrow rural roads with poor lane marking, small or no shoulders and in some cases poor driving visibility. In the community of Rio Linda, the water pipeline will be located along U and M Streets that have a number of residents and other structures that require traffic access.*

Data Request #36: Please identify the impact that pipeline construction may have on local residents, business and on street parking and the mitigation measures planned to minimize the impact

Response: The natural gas pipeline route proposed by PG&E will be parallel to, and sometimes adjacent to the rural roads along the route, but not actually constructed in the road or road right-of-way. In most cases the pipeline would be constructed within a 50-foot easement on agricultural land adjacent to roads. There would be a 100-foot temporary easement on the agricultural lands to accommodate all construction equipment.

Approximately 4,000 feet of the water pipeline route will be within the road or road right-of-way and there is some potential for temporary minor impacts to traffic and access along the route.

Prior to construction of the natural gas pipeline and water line, a traffic control plan will be prepared for submittal to Sacramento and Yolo counties for their review and approval. The construction contractor will be required to abide by county construction specifications outlining traffic control considerations. The traffic control plan will address:

- Road closures
- Flagging
- Signage
- Construction notification to emergency response agencies

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- Residence, business, and emergency vehicle access
- Parking or access restriction

The majority of the natural gas pipeline route segments pass through agricultural or low-density land uses with low levels of roadway traffic and almost no on-street parking. Rail lines, waterways, and highways are crossed via underground techniques that do not interfere with the existing operations. Typically, temporary reductions in traffic Levels of Service (LOS) are not considered significant if they are limited to less than a month in any 1-mile section of road and alternate route/access is provided.

Where the pipeline corridor crosses an existing transportation segment, one of three possible crossing techniques will be employed: open trench, bored crossing with casing and directional drilling. The method of construction chosen for each segment will be selected to minimize the disruption in flow of people or goods from present patterns at an acceptable construction cost. Construction of the gas pipeline within the proposed corridor is not anticipated to create long-term or permanent impacts of the rail, waterway, air or highway transportation system in the area. Short-term impacts may arise where the bored hole or directional drill work area may create temporary disruptions, adjacent to the segment.

It is not anticipated that the construction of the natural gas pipeline or water pipeline will have any significant impacts on local residents, business, or on street parking.

Data Request #37: Please indicate the types of traffic control programs that will be used to ensure safe roadway conditions, (such as lane marking, construction notices, roadway signage, detours, flagperson, etc.).

Response: All highways, road, railroad and waterway crossings will be installed in accordance with the permitting authority requirements. All necessary permits will be secured for highway, road and railroad crossings. Encroachment permits will be obtained for the crossings of State highways. Additional crossings will be constructed in accordance with County or governing agency regulations and specifications. Adequate barricades and lights will be provided around excavations at crossings in accordance with California Department of Transportation "Manual of Traffic Controls for Construction and Maintenance of Work Zones," and California Vehicle Code, Section 21400.

For open-trench cut and cover crossings, access over both public and private roads will be provided. Where trenches remain open, bypass roads will be built within the construction right of way allowing temporary access. Ditched crossings will be backfilled and tamped immediately after the crossings have been made. All road crossings will be restored to their original condition. In areas where the pipeline crosses public or private roads and where

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traffic volumes are low, traffic will either be: 1) routed around the construction area through signing and signaling; 2) directed along one-half of the roadway (where construction is underway on the adjoining half); or 3) routed across temporary trench bridging. Flaggers will be utilized as required. Alternate access for emergency vehicles, such as fire and ambulance services to local land uses, is to be maintained during construction. Specific traffic control plans (detailing signage placement and use of flaggers) will be developed by the contractor in accordance with all of the requirements of the local municipal agency responsible for the particular transportation corridor that is impacted.

Data Request #38: Please indicate what policies will be in place to ensure workers will park in designated areas. Please indicate if transportation will be available from a central parking area to and from the work site for the linears.

Response: The project site will serve as the central parking area for the project site and linear facilities, when possible.

For the gas pipeline, typical pipeline practice is for the contractor to assemble work crewmembers each morning at the contractor's yard for transport to the job site. Parking for personal vehicles and equipment will be limited to designated areas within preplanned laydown areas and the contractor's yard. Designated areas will be clearly delineated with appropriate signage. Work laydown areas and contractor's yard will be limited to the pipeline easement, including working strip, as well as negotiated land use with individual property owners.

The Applicant will implement a construction traffic control plan that will reduce the amount of vehicle trips to the plant site during the construction phase of the project.

ISSUE: *For both construction and operation, traffic approaching the Rio Linda/Elverta Power Plant from Highway 99 on either Elverta or Elkhorn Roads will cross the Union Pacific rail lines. The increase in traffic volume could result in unsafe conditions at the rail crossings.*

Data Request #39: Please indicate the level of rail service associated with the Union Pacific tracks.

Response: The Union Pacific Mainline rail currently handles, on average, 25-30 trains per day. Train schedules and the rail's level of service change daily depending on Union Pacific's customer's needs. (Personal communication, June 14, 2001, L. Neal, Union Pacific with M. dos Santos, Foster Wheeler Environmental Corporation)

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Data Request #40: Please indicate what mitigation measures the project plans to ensure that all traffic (workers, hazardous material deliveries and removal, and other truck traffic) will not result in an increase for potential traffic accidents.

Response: The following mitigation measures will be implemented to reduce or eliminate traffic impacts and the potential for traffic impacts:

- The Applicant will implement a construction traffic control plan that will reduce the amount of vehicle trips to the plant site during the construction phase of the project.
- The construction traffic control plan will address construction traffic crossing the nearby Union Pacific rail line at Elverta Road. Based on consultation with Sacramento County Technical Services Division, the plan may include stationing of flag persons at the railway crossing during heavy traffic periods.

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TECHNICAL AREA: Visual Resources

ISSUE: *The visible water vapor plume discussion provided in the Visual Resources section of the AFC (Section 5.10.2.4.8) does not provide detailed information regarding the frequency, duration and size characteristics of the cooling tower water vapor plumes. However, the AFC does note that the Applicant performed a Seasonal Annual Cooling Tower Impact (SACTI) modeling analysis. Staff will conduct a cooling tower plume modeling analysis to confirm the applicant's SACTI analysis results and to determine whether potential visual impacts from the cooling tower plume exist. Staff will require additional project and site data to complete this analysis.*

Data Request #41: Please provide electronic copies of the SACTI input and output files, a tabular summary of the plume dimension results, and the SACTI executable files for review. Please indicate if any modifications were made to the SACTI executable files and describe those modifications, if any were made. Please identify if multiple SACTI modeling runs were performed for day/night, fog/no fog, etc. ambient conditions, and if so provide all cases which were run in the tabular results summary.

Response: The Applicant is currently in the process of reviewing the cooling tower plume modeling results and reviewing options to reduce plume impacts to less than significant. Results of this review with a plan for the appropriate measures will be provided as soon as it is available.

Data Request #42: Please provide the meteorological data files used in the SACTI analysis, including a short description of the meteorological years provided and the meteorological station location. Staff is in the process of obtaining a six-year (1990-1995) Sacramento meteorological data set from National Climatic Data Center (NCDC). Staff will include both the Applicant's data set and the NCDC data set in their analysis, if they are different.

Response: The meteorological data for Sacramento Metropolitan Airport for 1991 through 1995 is included electronically with this submittal. The corresponding mixing height files are also included electronically. The 1995 meteorological data was used in the SACTI analysis because it is the most recent and preliminary modeling runs indicated that this data set produced the most conservative results (i.e., largest plumes).

Data Request #43: Please provide general cooling tower design data including tower physical parameters (length, width, height, number of cells, cell exhaust diameter, etc.), heat rejection rate, exhaust rate and liquid/gas ratio. The cooling tower exhaust rate should provide a reasonable worst-case operating scenario for modeling. Please explain the plant load conditions and ambient conditions that are the basis for the worst-case cooling tower exhaust rate value.

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Response: The cooling tower parameters are as follows:

Length	75	meters
Width	15.5	meters
Height	15.4	meters
Number of tower housings	2	
Number of cells	10	
Cell exhaust diameter	8.6	meters
Tower effective diameter	27.2	meters
Heat rejection rate	404	MW
Exhaust rate (air flow)	5891.3	kg/s
Liquid/gas ratio	1.5:1	(by weight)

The tower exhaust rate and heat rejection rate used for the model corresponds to the following scenario:

Ambient temperature:	96F
Relative humidity:	27%
Evaporation rate:	2,300 gpm
Load:	100%
Duct burners:	on
Fogger:	on

This is considered the worst-case operating scenario because it yields the highest evaporation rate. By contrast, at 20°F and 80% relative humidity, the evaporation rate is of 1,462 gpm.

ISSUE: *The visible water vapor plume discussion provided in the Visual Resources section of the AFC (Section 5.10.2.4.8) does not provide information regarding the frequency, duration and size characteristics of the Heat Recovery Steam Generators (HRSG) exhaust stack water vapor plumes. Staff will conduct a plume modeling analysis to determine the HRSG exhaust stack plume frequency and size characteristics. Staff will require additional project and site data to complete this analysis.*

Data Request #44: Please provide the following information regarding the HRSG exhaust parameters.

- a. Stack Exhaust Temperature;
- b. Moisture Content (% by Weight);
- c. Mass Flow, and;
- d. Average Molecular Weight.

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The Applicant may provide these exhaust parameters, in tabular form, for the range of ambient conditions (i.e. ambient temperature and relative humidity) that can be reasonably expected occur at the project site location; or if the Applicant desires they may provide a worst case exhaust condition that staff will model throughout the year. Please provide a short discussion regarding the operating assumptions and basis for the HSRG exhaust parameter data that is provided, including power augmentation (i.e. inlet air foggers) and duct burner operating status. Also, please indicate any relationship between the use of duct burners and/or power augmentation with ambient conditions (i.e. note temperature/relative humidity conditions when either will not be operated).

Response: The HRSG's exhaust parameters for various operating assumptions, including the operating status of inlet foggers and duct burners are summarized in the following table.

HRSG Exhaust Parameters, Per Stack							
	CTG Load	Fogger Status	Duct Burner Status	Stack Temperature °F	Moisture Content wt %	Exhaust Flow lb/h	Avg Molecular Weight lb/lbmol
Winter Minimum - 20 °F	100%	Off	On	182	8.54%	3,801,128	28.41
	100%	Off	Off	194	7.61%	3,790,000	28.47
	75%	Off	Off	178	7.74%	2,993,000	28.46
	50%	Off	Off	167	7.50%	2,448,000	28.48
Yearly Average - 60 °F	100%	On	On	182	9.62%	3,575,435	28.30
	100%	On	Off	192	8.70%	3,565,000	28.36
	75%	Off	Off	177	8.45%	2,886,000	28.38
	50%	Off	Off	167	8.16%	2,387,000	28.40
Hot Summer Day - 96 °F	100%	On	On	183	10.49%	3,455,486	28.20
	100%	On	Off	193	9.55%	3,445,000	28.26
	75%	Off	Off	180	8.51%	2,856,000	28.37
	50%	Off	Off	170	8.14%	2,377,000	28.39
Summer Maximum - 115 °F	100%	On	On	183	10.70%	3,425,537	28.18
	100%	On	Off	194	9.74%	3,415,000	28.24
	75%	Off	Off	181	8.10%	2,883,000	28.41
	50%	Off	Off	171	7.73%	2,388,000	28.43

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ISSUE: *Some features discussed in the text are not identified on Figure 5.10-1. Other features discussed in the text are labeled on the figure, but are difficult to read. The viewshed is not shown in its entirety for the 3-mile radius described in the text. Residences with potential views of the site are not shown on the map. The shaded area labeled on the map is not clearly shown. Staff requires that this information be clearly depicted on a revised map to assist in performing Staff's visual analysis.*

Data Request #45: Please provide a revised Figure 5.10-1 that clearly shows and labels the roads, canals, railroad line, utility corridors, Elverta Substation, Western Area Power Administration (Western) maintenance buildings, equestrian facility and associated trails, and other important features in the area that are discussed in the text.

Response: A revised version of Figure 5.10-1 showing Utility Corridors, WAPA Maintenance Facility, Elverta Substation, Equestrian Center, East Main Drain, and Union Pacific Railway is attached. For further clarification of surrounding roadway names, please see Figure 5.11-1.

Data Request #46: On the revised Figure 5.10-1, please show all residences within the foreground (up to ½-mile from the site) and middle ground (from ½-mile to 4 miles from the site) distance zones that are within the viewshed for the project site.

Response: A new figure is being prepared to show the requested information. This figure will be submitted as soon as it is available.

Data Request #47: Please provide a revised Figure 5.10-1 (or an additional figure) that clearly shows the viewshed for the project site for the foreground (up to ½-mile from the site) and middle ground (from ½-mile to 4 miles from the site) distance zones. On the figure, please indicate distances from the power plant site using concentric rings at intervals of ½-mile, 1-mile, 2-miles, 3-miles, and 4-miles.

Response: Please refer to Response to Data Request #46.

ISSUE: *Figure 3.3-1 is a site plan for the project site that shows a switchyard near the southwest corner of the site. However, none of the visual simulations prepared for the project show the switchyard.*

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Data Request #48: Please revise the existing or provide new visual simulations that show the switchyard in views from Key Observation Points (KOPs) 1, 2, 3, 4, and 6. Please provide 4 sets of 11" x 17" high-resolution photocopies of each of the visual simulations at life-size scale of the proposed switchyard from these KOP locations.

Response: Please refer to Response to Data Request #53.

ISSUE: *Figure 3.4-2 provides a scaled west elevation of the proposed power plant. However, no similar south, north, or east elevations are provided. Staff requires these to assist in performing visual analysis.*

Data Request #49: Please provide scaled north, south, and east elevations of the proposed project similar to that provided in Figure 3.4-2 for the west elevation.

Response: Elevations from north, east, south, and west are provided in Attachment #49.

ISSUE: *Union Pacific Railroad tracks run along the west boundary of the project site. The text does not describe whether passenger trains use these tracks.*

Data Request #50: Please provide information about the use of the railroad tracks by passenger trains. If passenger trains use the tracks, please provide a detailed discussion on the number of trains and passengers and other pertinent information on the visibility and views of the proposed project from the railroad line.

Response: The Union Pacific mainline rail currently serves two Amtrak passenger trains, numbers 11 and 14. These two trains travel between Seattle and Los Angeles on a daily basis. Train number 11 passes within view of the project area at approximately 5:45 am and train number 14 passes within view of the project area at approximately midnight. Because both trains travel by the project site during dark hours it is unlikely that passengers would be able to see the project during construction or operation. (Amtrack, 2001. www.amtrack.com, and personal communication, June 14, 2001, L. Neal, Union Pacific and M. dos Santos, Foster Wheeler Environmental Corporation)

ISSUE: *Figure 5.10-5b shows a visual simulation from the area of KOP 4 of only a portion of the power plant. Staff needs to see a visual simulation that shows the entire power plant, including the switchyard, in order to assist in performing Staff's visual analysis.*

Data Request #51: Please provide one or more visual simulations from the area of KOP 4 that show the entire power plant, including the switchyard. Please provide 4 sets of 11" x 17" high-

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resolution photocopies of the visual simulation(s) at life-size scale of the proposed project from this location.

Response: Please refer to Response to Data Request #53.

ISSUE: *Staff will need to include all photographs, visual simulations, and maps from the visual resources section of the AFC and responses to these data requests in the PSA and FSA.*

Data Request #52: Please provide electronic files of all photographs, visual simulations, and maps from the visual resources section of the AFC and the responses to these data requests so that Staff can include these in the Preliminary Staff Assessment (PSA) and Final Staff Assessment (FSA).

Response: Please refer to Response to Data Request #53.

ISSUE: *The visual simulations in the AFC do not show any landscaping treatment or other elements that may help blend the power plant and its associated features with their surroundings or that may help mitigate visual impacts of the proposed project.*

Data Request #53: Please provide visual simulations depicting landscaping treatment and other visual treatment that may help blend the power plant and its associated features with their surroundings or that may help mitigate visual impacts of the proposed project. Landscaping should be depicted at initial planting, at an age of approximately 5 years after installation and at maturity. Please provide 4 sets of 11" x 17" high-resolution photocopies of the visual simulations at life-size scale of the proposed project with landscaping treatment from each of the KOP locations.

Response: A landscaping treatment plan is being prepared. A simulation of the proposed project from each of the KOPs including the landscaping treatment will be provided as soon as it is available. The landscaping treatment plan and simulations will include wood or masonry fencing, landscaping strips along public rights-of-way, and other requirements of the Sacramento County zoning Ordinance. Requested views in Data Request #71 and #72 will also be provided.

ISSUE: *The 80-foot-high screening structure labeled as the turbine hall on Figure 3.4-2 appears massive. It is not clear from the description in the AFC what the purpose of the massive screening structure is and whether the full height and mass of the structure is necessary to screen elements of the power plant.*

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Data Request #54: Please provide a detailed discussion of the purpose and need for the turbine hall screening structure. In particular, please describe the elements of the power plant housed under the turbine hall that may require (and those which may not require) the full height and mass of the turbine hall to be effectively screened.

Response: The turbine hall includes a common bridge crane for lifting and moving the enclosed equipment (gas and steam turbines, gas compressors, etc). The height of turbine hall is set by a minimum lifting clearance required for servicing the steam turbine, the tallest enclosed equipment/structure.

ISSUE: *The AFC states that the proposed natural gas pipeline will be buried underground and “will not be visible from publicly accessible areas.” According to the AFC, the tie-in point for the proposed gas pipeline is near a rural residential area. The AFC does not clarify whether there would be any above ground features such as a gas metering station or other features at the tie-in point or at other locations along the proposed gas pipeline.*

Data Request #55: Please provide a description of the location, visibility, setting, appearance, visual impacts, and any aesthetic treatment for any and all above-ground features associated with the proposed natural gas pipeline.

Response: The pipeline will be buried under ground and it will not be visible from publicly accessible areas. The only above ground structures will be signage, valve operators, and the meter set.

Signage: The pipeline will be marked every 1000 – 2000 ft. with typical pipeline markers. The markers consist of a 2” galvanized post with wood signage on top. The marker stands about 8’-0” high and the wooden paddles are 24” long by 7” wide. These markers are required by Department of Transportation, 49 CFR Part 192.

Valve Operators: At the pipeline origination in the town of Yolo, there will be three additional valve operators extending above ground in the existing valve lot. The existing PG&E valve lot already has 3- valve operators extending above ground, approximately 36”. The 3-additional operators will be identical to that which is already there. The existing valve lot is protected by barricade consisting of pipe bollards with cross-members.

The aboveground equipment will not modify views in the area or create a significant visual impact.

ISSUE: *Figure 3.3-1 shows three construction laydown and parking areas on the project site. However, there is no description of construction-related visual impacts or mitigation measures associated with the laydown and parking areas.*

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Data Request #56: Please provide a description of the visibility, setting, appearance, visual impacts, and any aesthetic treatment or other mitigation measures intended to reduce visual impacts associated with the proposed construction laydown and parking areas.

Response: Eight-foot high fabric covered construction fencing will be installed along the project boundary on West 6th Street to screen direct views of the construction laydown and parking area illustrated in AFC Figure 3.3-1. The fabric fencing would also be placed on the southern border of the site for a distance of 800 feet from West 6th Street.

Data Request #57: Please describe how the construction laydown and parking areas will be treated upon completion of construction.

Response: Stockpiled top soil will be replaced on the construction parking and laydown areas and landscaping will be installed in accordance with the landscape plan (see Response to Data Request # 530).

Data Request #58: Please provide a full description of any and all other construction-related impacts associated with the project.

Response: The construction laydown areas will be located on the east and southern portions of the project site. The parked vehicles, equipment, and stored materials in this area will be most visible in views from West 6th Street, which are best represented by KOP 4 (AFC Figure 5.10-5a & b). Construction fencing with fabric screening will be installed along the West 6th Street project site boundary to prevent direct views of the construction area. The vehicles, equipment, and stored materials in the laydown area will be partially visible in these views, however the construction fencing will be the most dominant feature until project components are constructed and they become visible above the screening fence. After development of the generating facility's structures is completed, the laydown area will be returned to its present condition, screening fencing will be removed, and landscaping will be installed as outlined in the landscape treatment plan (see Response to Data Request #53).

ISSUE: *Figure 3.4-2 shows a turbine hall that is 80 feet in height. However, Table 5.10-2 does not identify a turbine hall or any other features 80 feet in height.*

Data Request #59: Please identify the correct dimensions of the turbine hall and add this information to Table 5.10-2.

Response: AFC Table 5.10-2 has been revised to include the turbine hall as shown below:

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Table 5.10-2 (Revised). Approximate Dimensions of the Major Power Plant Features

Feature	Height (feet)	Length (feet)	Width (feet)	Diameter (feet)
HRSO Units	97	178	30	--
HRSO Stacks	150	--	--	18
Turbine Hall	80	460	80	
Sound barrier wall	22	330	--	--
Combustion Turbines	45	75	45	--
Cooling Tower		240	90	43
Height to top of structure	42.5			(each cell)
Height to tops of cones	56			
Raw Water Storage Tank	30	--	--	65
Demineralized Water Storage Tank	30	--	--	20
Control/Administration/Maintenance Building	15	145	50	--
Poles supporting power line connecting turbines to switching station	100	--	--	2

ISSUE: *Page 5.10-12 of the AFC states that the layout of the substation is indicated in Figure 3.4-1. However, there is no substation shown on this figure. The switching station discussed on this page is also not shown.*

Data Request #60: Please clarify the location for the substation referred to on page 5.10-12.

Response: The reference to “substation” on AFC page 5.10-12 was incorrect. It should have referred to “switchyard,” instead. The location and layout of the switchyard is illustrated in Figure 3.3-1, Site Plan, Revision G, attached.

Data Request #61: Please show the location and layout of the switching station, including its connection to the nearby transmission line discussed on page 5.10-12.

Response: Please refer to Response to Data Request #60.

ISSUE: *The Sacramento County Zoning Ordinance identifies that there must be a perimeter fence at least 6 feet high of solid wood or masonry (see page 5.10-21 of the AFC). However, an eight-foot high chain link fence with an additional two feet of barbed or razor wire around both the power plant and switching station is described on page 5.10-12 of the AFC. There is no description of how the proposed project will comply with this requirement of the zoning ordinance.*

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Data Request #62: Please describe how the proposed project will comply with the requirement of the Sacramento County Zoning Ordinance that specifies that there must be a perimeter fence at least 6 feet high of solid wood or masonry around the project.

Response: Please refer to Response to Data Request #53.

ISSUE: *The Sacramento County Zoning Ordinance identifies that there must be a minimum landscaped strip of 25 feet in width along public rights-of-way (see page 5.10-21 of the AFC). However, the AFC does not describe how the proposed project will comply with this requirement of the zoning ordinance.*

Data Request #63: Please describe how the proposed project will comply with the requirement in the Sacramento County Zoning Ordinance that specifies that there must be a minimum landscaped strip of 25 feet in width along public rights-of-way.

Response: Please refer to Response to Data Request #53.

ISSUE: *The AFC states that “a landscape plan will be developed” (AFC, page 5.10-13) and “the project will include the preparation and implementation of a landscape plan that will comply with the County Zoning Ordinance” (AFC, page 5.10-21). The AFC also states that “a Landscape Plan will be prepared when final construction drawings of the project are completed” (AFC, page 5.10-20). Also, the AFC identifies potentially significant visual impacts from project structures at KOPs 4, 5, and 6 that the Applicant considers mitigable with implementation of landscaping. Staff requires this detailed landscape plan as soon as possible in order to conduct its visual analysis of the proposed project and determine the project’s compliance with LORS. Without this detailed landscape plan and the visual simulations showing landscaping for the project, Staff’s visual analysis for the PSA may be delayed.*

Data Request #64: Please provide Staff with the detailed landscape plan for the proposed project.

Response: Please refer to Response to Data Request #53.

ISSUE: *The AFC identifies potentially significant visual impacts from plumes at KOPs 5 and 6 but does not describe any measures (e.g., a plume abated cooling system) to reduce those impacts to less than significant levels.*

Data Request #65: Please provide a detailed description of any measures intended to reduce significant impacts from visible plumes to less than significant levels for the proposed project.

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Response: The Applicant is currently in the process of reviewing the cooling tower plume modeling results and reviewing options to reduce plume impacts to less than significant. Results of this review with a plan for the appropriate measures will be provided as soon as it is available.

ISSUE: *The photograph of the view from KOP 5 (Figures 5.10-6a and 5.10-6b) shows an overexposed backlit sky, a brown, barren-appearing field, and fence which dominated the foreground. The photograph is of poor quality and does not accurately represent the existing visual quality and character of views from the area of this KOP. Staff needs to see a photograph of substantially higher quality to replace the existing photograph used for the visual simulation in order to assist in performing staff's visual analysis.*

Data Request #66: Please provide 4 sets of 11" x 17" high-resolution color photocopies of a new photograph from KOP 5 that is of high quality and accurately represents the existing visual character and quality of views from the area. The photograph should be taken at a time of day and during weather conditions that avoid an overexposed sky and that depict the field in its current state covered with green grass. The photograph should also avoid showing the fence in a manner that dominates the view.

Response: Please refer to response to Data Request #53.

Data Request #67: Please provide 4 sets of 11" x 17" high-resolution color photocopies of a new visual simulation at life-size scale of the proposed project from the area of KOP 5 using a new higher quality photograph as described above.

Response: Please refer to response to Data Request #53.

ISSUE: *The photograph of the view from KOP 6 (Figures 5.10-7a and 5.10-7b) shows the view from the intersection of Q Street and Marysville Boulevard. The foreground of this view is cluttered with power poles, power lines, fences, a large expanse of the roadway, and a somewhat barren, weedy field and is not representative of the existing visual quality and character of views from the area of this KOP. A more representative view from this KOP area would be from the intersection of Straugh Road and Marysville Boulevard or from a residence driveway (on West 6th Street) just north of this location. Staff requests a new photograph from the KOP area that more accurately represents the existing visual character and quality of views from this area in order to assist in performing staff's visual analysis.*

Data Request #68: Please provide 4 sets of 11" x 17" high-resolution color photocopies of a new photograph from the area of KOP 6 that is of high quality and accurately represents the existing visual character and quality of views from this area. The new photograph should be

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taken from the intersection of Straugh Road and Marysville Boulevard or from a residence driveway just north of this location. The photograph should be taken at a time of day and during weather conditions that avoid an overexposed sky and from a position that shows the field with green grass that is not cluttered with power poles, fences, or a dominant expanse of roadway.

Response: Please refer to response to Data Request #53.

Data Request #69: Please provide 4 sets of 11" x 17" high-resolution color photocopies of a new visual simulation (to replace Figure 5.10-7b) at life-size scale of the proposed project from the area of KOP 6 using the new higher quality photograph as described above.

Response: Please refer to response to Data Request #53.

Data Request #70: Please provide a description of the existing visual character and quality, and a detailed analysis of the visual impacts of the proposed project, from the revised location from KOP 6.

Response: Please refer to response to Data Request #53.

ISSUE: *The proposed power plant would be located in an almost direct line of sight with U Street and in full view and within ¼-mile of a residence located on the south side of U Street. The proposed power plant would be a dominant element in views from these locations. Because of the high sensitivity of these views, staff requests that a new KOP (KOP 8) be established to represent views from this area.*

Data Request #71: Please provide 4 sets of 11" x 17" high-resolution color photocopies of a photograph from the area of the residence located on the south side of U Street within ¼-mile of the project site. The photograph should be of high quality and accurately represent the existing visual character and quality of views from this area.

Response: Please refer to response to Data Request #53.

Data Request #72: Please provide 4 sets of 11" x 17" high-resolution color photocopies of a new visual simulation at life-size scale of the proposed power plant from the area of the residence located on the south side of U Street within ¼-mile of the project site.

Response: Please refer to response to Data Request #53.

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Data Request #73: Please provide a description of the existing visual character and quality, and a detailed analysis of the visual impacts of the proposed project, from the area of KOP 8.

Response: Please refer to response to Data Request #53.

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TECHNICAL AREA: Water and Soil Resources

ISSUE: *Construction and operation of the Rio Linda/Elverta Power Project (RLEPP) may induce water and wind erosion at the power plant site and along the associated linear facilities. Stormwater runoff may also contribute to erosion and sedimentation as well as transport pollutants off-site.*

Data Request #74: Please provide a draft erosion control and stormwater management plan that identifies all measures that will be implemented at various locations of the project during construction and operation of the proposed RLEPP. The draft erosion control plan shall identify all permanent and temporary measures in written form and depicted on a construction drawing(s) of appropriate scale. The purpose of the plan is to minimize the area disturbed, to protect disturbed and sensitive areas, to retain sediment on-site and to minimize off-site effects of stormwater runoff.

Response: The draft Erosion Control and Stormwater Management Plan is provided in Attachment #74.

Data Request #75: Please provide any revegetation and specific best management measures to be employed to control stormwater runoff during construction and operation at identified locations. In addition, any measures necessary to address Nationwide Permits or Streambed Alteration Agreements, as required, should be identified. Revegetation efforts should address both erosion control and habitat restoration.

Response: Please refer to Response to Data Request #74.

Data Request #76: Please specify the type of seed and fertilizer, seeding and fertilizer rate, application method, the type and size of any container plants to be used and the criteria for judging revegetation success.

Response: The specific seed, fertilizer and other details will be provided in the final landscape plan.

Data Request #77: Please identify maintenance and monitoring efforts for all erosion, stormwater runoff control and revegetation measures including measures to rectify unsuccessful revegetation efforts.

Response: Please refer to Response to Data Request #74.

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ISSUE: *The proposed project will require an annual average water use of 2,823 Acre Feet per Year (AFY) or 1,627 Gallons Per Minute (GPM). Because of the high water demand of the proposed project, alternatives to the proposed cooling technology that would reduce water demands on the proposed source must be evaluated. In the AFC the applicant only provided a brief discussion of water supply alternatives (AFC Section 3.10.5, p. 3-76 & 77).*

Data Request #78: Please provide an analysis of the cost and water use associated with the use of dry and wet/dry cooling technology for the proposed Rio Linda/Elverta Power Project. The analysis should identify, for both dry and wet/dry cooling technologies, the estimated capital and operating costs and anticipated water demand.

- a. Please provide the assumptions and calculations underpinning the capital costs, including, but not limited to, discussions of whether labor and financing costs are included in the estimates, and the performance levels for the technologies specified.
- b. Please provide energy balances for the combined cycles at 50%, 75%, 100% and peak loads, and 60°F and 115°F with duct burners on.
- c. Please provide quantities of water used (assuming zero liquid discharge), and water preparation and clean-up chemicals used for the various configurations.

Response: The requested information is provided in Attachment # 78.

Data Request #79: Please include a discussion of the relative environmental benefits and detriments of wet, wet/dry, and dry cooling technologies. This discussion should include evaluation of water demand, particulate matter emissions associated with the use of wet and wet/dry cooling technology, visual resources implications, and land use requirements.

- a. Please quantify air emissions from the project stacks and cooling towers, for the various configurations, 1) assuming constant fuel use, efficiency and capacity losses, and increased parasitic loads, and 2) assuming maximized fuel use, efficiency and capacity losses, and increased parasitic loads.
- b. Please quantify the footprints and dimensions of the cooling towers in the various configurations.
- c. Please quantify occurrences and sizes of visible plumes for the various configurations.
- d. Please quantify noise levels from the various configurations.

Response: Cooling tower particulate emissions, plume frequency and size for the wet/dry cooling option were not modeled. It is estimated that the particulate matter emissions and plume size will be about a half of the base case design (10-cell CT). However, it is expected that the frequency of plume will remain the same. The HRSG stack emissions also remain

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same, as they are not impacted by the cooling options. For other data and information, including drawings, please see Attachment #78.

Data Request #80: Please conduct a feasibility analysis of the use of the contaminated plume underlying the McClellan Air Force Base rather than uncontaminated groundwater for cooling purposes. Include in this analysis a discussion of constraints, calculations, assumptions, cost estimates and technical modifications that would be required to allow use of the contaminated groundwater at RLEPP.

Response: This assessment of the potential to pump and treat water from the contaminated plume underlying the McClellan Air Force Base for use at the RLEPP assumes that the resources cited below are correct. In addition to the sources cited below, we conducted telephone interviews with Mr. Phil Mook, the Installation Restoration Program Division chief for McClellan AFB; Mr. Paul Brunner, Base Environmental Management for McClellan AFB; and Mr. James Taylor, Department of Toxic Substance Control.

Currently the treatment plant capacity is 2,000 gpm. The actual treatment rate has been 1,200 – 1,400 gpm, or approximately 1,900 acre feet annually. [Interview with Phil Mook, 5-29-01; Sacramento Business Journal article “McClellan Cleanup Crawls On”, 7-17-2000 <http://sacramento.bcentral.com/sacramento/stories/2000/07/17/story6.html>.] The treatment plant is considered experimental technology. [McClellan Air Force Base Basewide Feasibility Study, Executive Summary (2/98) <http://208.219.168.12/Adm/VOC/d035.htm>; U.S.A.F. McClellan A.F.B. NPL/BRAC 1995.] It has been on-line 80-90% of the time. [Interview with Phil Mook, 5-29-01.] The treatment plant capacity could be increased. The cost to do so is unknown. The current treatment plant cost \$4,000,000 to build. [Technology Application Analysis: Pump and Treat of contaminated Groundwater at Operable Unit B/C McClellan Air force Base, California, <https://www.denix.osd.mil/denix/Public/Library/Remedy/MCBC/mclebc05.html>.]

Given the current technology there will be groundwater extraction and treatment until 2150. [Interview with Paul Brunner, 5-24-01.] Although the volume of groundwater extracted and treated will decrease over time, there will not be a significant decrease in the extraction rate over the next thirty years. [Interview with Paul Brunner, 5-24-01.] Given the duration of the clean-up process, increasing the rate of extraction does not significantly shorten the clean-up process. [Interview with Paul Brunner, 5-24-01.]

The current cost of treating groundwater ranges from \$65,000,000 to \$75,000,000 at present value, for thirty years of extraction and treatment for 1,900 acre feet annually. [McClellan Air Force Base Basewide Feasibility Study, Appendix E “Costs Estimates” (2/98).] This does not include amortized capital costs. To supply 100% demand to the FPL project site the treated groundwater would have to be increased by 50%. Not including new capital costs to upgrade

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the treatment plant, the present day value of treated groundwater for the project for thirty years, would be \$90,000,000 to \$112,500,000.

The groundwater would have to be treated on site and then transported by pipeline to the FPL project site. One of the primary goals of the clean-up is to limit exposure to humans. [McClellan Air Force Base Basewide Feasibility Study, Executive Summary and Section 6.1 (2/98) <http://208.219.168.12/Adm/VOC/d035.htm>] The USAF Feasibility Study points out that risk to humans now is very low because the contaminants are deep underground. [McClellan Air Force Base Basewide Feasibility Study, Section 6 (2/98) <http://208.219.168.12/Adm/VOC/d035.htm>]

Although the treated groundwater meets its NPDES discharge permit, it still has contaminants. [California Regional Water Quality Control Board Central Valley Region Order 99-067, NPDES Permit CA0081850; Technology Application Analysis: Pump and Treat of contaminated Groundwater at Operable Unit B/C McClellan Air force Base, California

<https://www.denix.osd.mil/denix/Public/Library/Remedy/MCBC/mclebc06.html>.] It is unclear how the use of this water would result in releases of these solvents to the environment. It is unclear what technology would need to be employed to prevent the release of solvents to the air. It is also unclear what permitting would be required from the Air Resources Control Board. [Interview with James Taylor, 5-31-01.] Lastly, currently unrecognized contaminants may be identified in the future that could lead to liability on the part of the RLEPP.

Any change in the use of treated groundwater from McClellan AFB would require a change to the current Record of Decision. [Interview with Phil Mook, 5-29-01.] It would require approval by USEPA, Department of Defense and the County of Sacramento. [Interview with Phil Mook, 5-29-01.] It would require the appropriate NEPA documentation since it is a significant change to an existing project. [Interview with Phil Mook, 5-29-01.]

In addition to the regulatory hurdles at the federal level, there would be significant issues to resolve at the state level. The water that is treated is currently discharged to Magpie Creek and Beaver Pond. [California Regional Water Quality Control Board Central Valley Region Order 99-067, NPDES Permit CA0081850.] Magpie Creek is now, for some distance, a year-round stream, due to this discharge. [Interview with James Taylor, 5-31-01.] It supports a riparian habitat based on year-round flows. Any change to the flow regime of Magpie Creek would involve extensive environmental assessment and permitting.

The contaminants at the site are described in the documents below:

U.S.E.P.A. Record of Decision EPA/ROD/R09-95/136,
<http://www.epa.gov/superfund/sites/rodsites/0902759.htm>;

McClellan Air Force Base Basewide Feasibility Study, Introduction, §1.2.4,
<http://208.219.168.12/Adm/VOC/d035-01.htm#TopOfPage>;

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Technology Application Analysis: Pump and Treat of contaminated Groundwater at Operable Unit B/C McClellan Air force Base, California, <https://www.denix.osd.mil/denix/Public/Library/Remedy/MCBC/mclebc02.html>;

Federal Remediation Technologies Roundtable Abstract, <http://bigisland.tclients.com/frtr/00000015.html>

Since 1979, multiple investigations have identified VOCs in the Base soil and soil gas, and in groundwater monitoring wells, onbase production wells, and offbase residential wells. VOCs constitute the widespread and common subsurface contamination at McClellan AFB. The most frequently encountered VOCs include trichloroethene (TCE), tetrachloroethene (PCE), 1,1-dichloroethene (1,1-DCE), 1,1,1-trichloroethane (1,1,1-TCA), and 1,1,2-trichloro-1,2,2-trifluoroethane (Freon-113). Other commonly found contaminants include cis-1,2-DCE, 1,1-dichloroethane (1,1-DCA), trichlorofluoromethane (Freon-11), dichlorodifluoromethane (Freon-12), trans-1,2-DCE, 1,2-DCA, vinyl chloride, carbon tetrachloride (CTCL), chloroform, methyl benzene, xylenes, and benzene. Of the compounds most frequently encountered, TCE and PCE contribute the bulk of contaminant mass in some areas, but 1,1,1-TCA and 1,1-DCE are significant in other areas. Contamination includes electroplating wastes with heavy metals and oils contaminated with polychlorinate biphenyls (PCBs) (McClellan Air Force Base Basewide Feasibility Study, Introduction, §1.2.4, <http://208.219.168.12/Adm/VOC/d035-01.htm#TopOfPage>).

It appears to be possible to run a pipeline from the treatment plant to the project site. For purposes of this feasibility analysis it was assumed that a pipeline would run down 24th Street to U Street, and then cross Dry Creek to the project site. The distance would be approximately 8 miles. Costs for such a pipeline could be expected to cost roughly \$3 to 6 million.

In summary, the project applicant is unable to assume the risk and liability of using treated groundwater from McClellan AFB given the environmental permitting issues, the experimental nature of the treatment methodology, and the past history of new contaminants being identified at McClellan AFB and in treated water from similar sites.

ISSUE: *When average annual and peak water consumption figures are estimated, they generally result in an under and over estimation of a project's water demand, respectively. This is because a facility does not continuously operate year round at average or peak conditions. The Water Usage Rates (AFC, Table 3.4-9) indicates that 1,627 gallons per minute (gpm) would be used on average (staff assumes based on the proposed 3.5 cycles of concentration); the peak usage of water will be 3,010.7 gpm (AFC, Table 3.4-10). The estimated average annual water use is 2,823 acre-feet per year (AFC, Table 3.4-9).*

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Data Request #81: Please show the calculations used to derive the water usage rates shown in Tables 3.4-9 and 3.4-10.

Response:

Daily Water Requirements. The daily water consumption requirements (Case 5, Table 3.4-10; Streams 2, 11, 12, 26, 27 and 37) are derived from the water balances for plant base load operation at annual average temperature of 60 degrees F. In this calculation, the cooling tower make-up (Stream 2) was adjusted upward (by 4%) to 1,467 US gpm.

Annual Water Requirements. The annual water consumption requirements are derived from the weighted daily requirements for cooling tower make-up at part load duct firing and annual average temperature of 60 degrees F (Case 4, Table 3.4-10; Stream 2). The weighted daily requirement for cooling tower make-up is estimated to be 1,578 US gpm (2,546 acre-ft/y) which when combined with other plant water usage requirements (Streams 11, 12, 26, 27 and 37) results in an annual water consumption of 2,823 US gpm.

Data Request #82: The applicant has indicated that the cooling towers will operate at 3.5/2.5 cycles of concentration (AFC Supplement, p.45). Other facilities that have employed zero discharge systems are capable of greater cycles of concentration, thus maximizing the efficiency of water use on site. Please provide an analysis and discussion of the possibilities of cycling the concentrations in the cooling towers 10, 15 and 20 times and provide recalculations of water uses for these operation conditions. Include in this discussion, an explanation of any constraints that may limit the number of cycles of concentration in the cooling towers.

Response: The zero liquid discharge system proposed for RLEPP employs a continuous sidestream cleanup process in order to maintain circulating water quality at desired levels. Based on the actual water quantity that is transferred to the evaporator system (approximately 2-3 gpm) as a function of cooling tower evaporation (2000-3000 gpm) the effective cycles of concentration are approximately 99.9, well in excess of other typical facilities. Because of concerns over silica solubility in the circulating water and general concerns by the Applicant to minimize cooling tower drift PM₁₀ amounts, the actual dissolved constituents are controlled by the zero discharge system in the 2.5 to 3.5 ppm range. As shown in the water balances in Table 3.4-10, the cooling tower evaporation accounts for over 95% of all plant water usage in all anticipated conditions. Essentially the process reuses all water to the maximum extent possible.

Data Request #83: Identify the likely number of days per year the RLEPP will operate under summer maximum conditions.

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Response: The maximum summer condition used for the extreme case is just that. The 115 degree F condition was identified as the highest expected condition for this location, a condition that based on records has occurred only one day in the last 50 years. Accordingly the likely number of days per year expected at this condition is essentially zero.

ISSUE: *The applicant has proposed to use groundwater to supply water resources to the RLEPP project. Three wells will be constructed at a depth of approximately 510 feet with three screened sections (Response to Data Adequacy Comment #52 & 53). One of the screened sections will be in the lower portion of the Fair Oaks Formation, while the other two sections will be in the upper portion of the Mehrten Formation (Response to Data Adequacy Comment p. 35). According to the AFC supplement, the water quality of the Mehrten Formation decreases with depth Total Dissolved Solids (TDS) levels at 2000mg/l at depths ranging from 800 to 1200 (Supplement p. 33).*

Data Request #84: Please provide information on the analysis conducted to come to the results provided in Response to Data Adequacy Comment #53, including assumptions, calculations and vendor performance data that verifies the limits on the zero liquid discharge system described.

Response: Initial design of the zero liquid discharge system is based on analyses received primarily from RL/ECWD of their historical water quality. This water, as indicated in Data Adequacy Response #53, is drawn primarily from the upper formation (Fair Oaks). Also as indicated, water quality decreases with increasing depth of the well withdrawal zone. The new wells drilled by the RL/ECWD are expected to be finished at the 510-570 foot depth. Other producing wells in this zone [Northridge Poker Lane (560 feet) and RL/ECWD well 2A (570 feet)] are currently producing water in the 190-260 ppm TDS range, a TDS range approximately 25% higher than the 189 ppm assumed in the initial design. This slightly higher range, which we consider a worst-case scenario, will have a minor impact to the final ZLD design and operation, and is not considered a significant change. Silica concentration, one of the primary design drivers for the system, does not increase significantly for the 510-570 foot deep wells.

The design of the zero liquid discharge system is that of sidestream dissolved solids removal. Essentially dissolved substances must be removed at the same rate they are added by the makeup water supply. In this way constituents are maintained in the circulating water system in a set control range that provides for proper scaling control and minimizes PM₁₀ emissions by the cooling tower. The anticipated target range for these constituents was provided in Response to Data Adequacy Request #63. Additional details of that process are also given in Response to Data Adequacy Request #63.

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Because all dissolved solids in the water are removed, solids production from the process is essentially proportional to the amount of TDS in the water. Utilizing the Eco-Safe/clarifier process hardness and silica are relatively easy to remove with roughly an equal quantity of regenerant to TDS being removed, while monovalent cations (such as sodium) are more difficult to remove. This is one reason that Eco-Safe was selected for this moderate TDS/high silica water supply. However, assuming all things equal, a simple ratio serves as a good approximation. Specific analysis and pilot testing of purely Pre-Mehrten Formation water would have to be performed to establish the exact impacts. In addition to the increased solids/sludge generation, cooling tower drift would also increase. Clearly a control range of 700-1000 ppm as proposed is not possible if the makeup water supply is 2000 ppm. Expected control range would increase to roughly 4000 ppm, increasing cooling tower PM₁₀ emissions by a factor of four.

Operational impacts cannot be fully quantified without specific analysis information on the deeper water. As mentioned previously, costs for treatment and solids disposal will increase proportionally to the amount of TDS in the water. In addition, such a high TDS source will substantially increase circulating water treatment costs for scaling (either in the system or through use of pretreatment) and corrosion control. The current plan for a small back-end evaporator would likely need to be changed in favor of open air ponds to reduce the much higher parasitic load that would otherwise result. The balance of the system described in Response to Data Adequacy Comment # 63 would have to be expanded to treat the poorer quality water supply. These impacts are estimated below:

Water Quality Level	RLECWD Existing	510 – 560 feet Depth Quality	Pre-Mehrten Formation
Estimate TDS	189	235	2000
Pond size	None	None	20 acres (estimated)
Evap power load	0.6 MW	0.8 MW	6 MW (if used)
Annual solids production	2000 tons	2500 tons	20,000 tons
Solids disposal costs (@\$60/ton)	\$120,000/yr	\$150,000/yr	\$1,200,000/yr
Chemical Costs, ZLD system	\$218,000/yr	\$275,000/yr	\$2,200,000/yr
ZLD Resin Rplmt	\$78,000/yr	\$98,000	\$150,000/yr
Pretreatment Costs or Excess Circ Water Treatment	\$0 /yr	\$0 /yr	\$250,000/yr
Power Sales (@ \$35/MWh) w/o ponds	\$169,000/yr	\$225,000/yr	\$1,690,000/yr
Total Annual Operating Costs	\$585,000	\$748,000	\$5,490,000
Estimated Installed Capital Cost	\$5,000,000	\$5,500,000	\$12,000,000

Notes:

1. Sludge materials assumed to be non-hazardous in all cases
2. Impact of increase well pumping costs not included
3. Capital cost for ponds not included; evaporator operation assumed in summaries
4. Pond size not calculated, based on similarly sized permitted projects
5. Caustic and sulfuric acid at \$265 per 50% wet ton and \$130 per ton (93%) respectively

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Data Request #85: Please provide copies of the reference document(s) for the water quality and aquifer zone estimates of the Laguna, Fair Oaks and Mehrten Formation stated on p. 33 of the Response to Data Adequacy Requests.

Response: Copies of the following referenced are provided as Attachment #85A, B, & C:

Rio Linda/Elverta Community Water District (RLECWD). 2000. Rio Linda/Elverta Community Water District Master Plan. November 2000.

Rio Linda/Elverta Community Water District (RLECWD). 2001. Negative Declaration for Rio Linda/Elverta Community Water District Master Plan. January 29, 2001.

California Department of Water Resources (DWR). 1974. Evaluation of Ground Water Resources: Sacramento California. Bulletin No. 118-3.

Data Request #86: Please provide an evaluation of the potential for upwelling of brackish groundwater from the lower portions of the Mehrten Formation that could be induced by project pumping.

Response:

INTRODUCTION

Montgomery Watson-Harza (MWH) has prepared a preliminary groundwater investigation for Rio Linda/Elverta Community Water District (RL/ECWD) that evaluates the regional effects of several groundwater extraction and recharge scenarios, both alone and in combination with additional growth in the Rio Linda/Elverta specific plan area (MWH, 2001, Draft Rio Linda/Elverta Community Water District Groundwater Impact Investigation). Copies of this investigation, which includes a 3,000 acre-ft./year scenario equivalent to the RLEPP, may be requested directly from RL/ECWD. The investigation included:

1. Evaluating changes in groundwater conditions resulting from increased groundwater extractions in the RL/ECWD service area to assess the potential effect to RL/ECWD and surrounding groundwater users under a range of groundwater extraction scenarios.
2. Estimating the quantity and geographic distribution of in-lieu groundwater recharge implemented in the Natomas Mutual Water Company service area required to mitigate impacts, if any, and evaluating how such recharge would mitigate for the potential changes in groundwater characteristics [e.g., elevations, storage, and movement of the existing McClellan Air Force Base (AFB) contaminant plume] resulting from increased groundwater extraction.

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A range of groundwater extraction and recharge scenarios were simulated using the North American River and Sacramento County Combined Integrated Groundwater and Surface Water Model (IGSM). This model was originally developed for the American River Water Resources Investigation (ARWRI) conducted by the U. S. Bureau of Reclamation (USBR) and later updated by the American River Basin Cooperating Agencies (ARBCA) for their Regional Water Master Plan effort.

The version of IGSM used for the study originates from the ARWRI version of the model used for the “Draft Water Forum Solution Model” developed for the Sacramento Area Water Forum. The purpose of the Water Forum was development of a conjunctive use strategy for the groundwater basin underlying northern Sacramento County and southern Placer County. The Water Forum used the approved 1993 General Plan build-out conditions for the year 2030 (including the 1995 General Plan Update). The selection of this model with slight modifications was based on the need to 1) establish as a baseline how the groundwater basin would look if elements of the Water Forum Plan were implemented, and 2) look at, on a regional basis, the impacts of additional groundwater extraction and recharge scenarios.

The IGSM is a finite element, quasi three-dimensional, multi-layered model that integrates surface water and groundwater on a monthly time step. The IGSM was developed for use as a regional planning tool for large areas influenced by both surface water and groundwater. The tool is well equipped to accommodate input and output of land use and water use data over large areas. Data input includes hydrogeologic parameters, land use, water demand, precipitation and other hydrologic parameters, boundary inflows, and historical water supply. For purposes of parameter definition and developing water budgets around physical and/or political boundaries, the IGSM divides Sacramento, Placer, Sutter, and San Joaquin Counties into subregions. Each subregion is further divided into unique numbered elements varying from 200 to 800 acres in size. Overlying this grid is a coarse parametric grid utilized for specifying aquifer and other parameters.

The IGSM was selected for the project because it is the basis for the Sacramento Area Water Forum Agreement and ARBCA’s alternative analyses, and because it is the model used for regional planning by the USBR and California Department of Water Resources (DWR) for projects such as the ARWRI, the Central Valley Project Improvement Act (CVPIA), and the CALFED Bay-Delta process. The IGSM is in the public domain and the DWR, USBR, and the Bay Delta Modeling Forum are supporting the on-going reverification of IGSM as a regional water resources planning tool. The Applicant understands that the model is available from RL/ECWD, and therefore withdraws its Objection to Portions of Data Request 37, filed previously.

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A “Static Run” approach was utilized for this investigation. With this approach, model conditions related to land use and water demand are set to projected values anticipated to prevail at some future point in time. For this investigation, land use and water use data were set to the year 2030 projected levels. Further, in the static run approach projected levels of land use and water demand are assumed to occur in the first year of the groundwater simulation and in every subsequent year; that is, there is no “phasing” of water demand or changes in land use.

After the model initial conditions have been set, the model is executed with those conditions through the historical 70-year hydrologic record for the region. Approximately the first 10 to 20 years of the simulation are characterized by falling groundwater levels as the groundwater system achieves a quasi-equilibrium state (that is, the point where the groundwater system is no longer effected by the initial conditions and groundwater recharge is in long-term equilibrium with groundwater extractions). Subsequent to the equilibration period, groundwater levels continue to fluctuate, but do so primarily in response to changing hydrologic conditions. The range within which the groundwater basin fluctuates prescribes the estimated long-term response of the groundwater system to the assumed land use and groundwater extraction conditions.

The Water Forum General Plan build-out levels of land use and water demand in the RL/ECWD service area were used to reflect the appropriate baseline conditions. Project groundwater extraction and recharge scenarios were then added to the baseline conditions and to estimate the incremental changes and to relate these changes to increased pumping costs, de-watering of existing wells, upwelling of poor water quality, contaminant plume movement, and land subsidence.

The geology and geohydrology in Placer and Sacramento County, and in particular portions of the investigation area, are complex. Consequently, the IGSM is based on a conceptual model of the groundwater basin represented by a three-layer aquifer system, as discussed in Appendix D of TM 1 (MWH, 2001). Important assumptions of the conceptual model include:

- Aquiclude 1 - A discontinuous semi-confining layer near the ground surface
- Aquifer 1 - Water bearing deposits overlain by Aquiclude 1
- Aquiclude 2 - A discontinuous semi-confining clay layer between Aquifers 1 and 2
- Aquifer 2 - Water bearing deposits between Aquiclude 2 and the base of high quality groundwater with low total dissolved solids (TDS)
- Aquifer 3 - Non-potable groundwater with high TDS above the base of the usable aquifer

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The conceptual model is largely based on geologic, hydrologic, and geohydrologic information presented in *Bulletin 118-3* (DWR, July 1974) supplemented by additional local studies.

POTENTIAL FOR BRACKISH WATER UPWELLING

The request is for an evaluation of the potential for upwelling of brackish groundwater from the lower portions of the Mehrten Formation that could be induced by groundwater extraction for the project. It should first be noted that the IGSM is not a contaminant transport model. In addition, the IGSM simulates multi-layer, two-dimensional flow within an aquifer, and the only vertical flow component is the leakage between aquifers. The IGSM model used for the RL/ECWD groundwater investigation has the same limitations that any regional groundwater flow model would have for estimating groundwater flow velocities and directions. In particular, the regional model does not simulate potential preferential flow paths resulting from local coarse-grained permeable stream channels in the subsurface that would affect local flow directions and velocities of both groundwater flow and associated contamination. Within these limitations, the RL/ECWD groundwater investigation did use the IGSM to obtain general migration directions between aquifers 1 and 2.

The conceptual model described above and in TM 1, Appendix D (MWH, 2001) assumes that the lower Mehrten Formation contains low TDS water. Since the upper and lower Mehrten are both within Aquifer 2, the IGSM cannot be used to evaluate upwelling within the Mehrten Formation. However, the RL/ECWD groundwater investigation did use the IGSM to analyze the potential for upwelling from Aquifer 2 to Aquifer 1 (from the Mehrten Formation to the overlying Fair Oaks Formation). Because the groundwater extraction scenarios in the investigation assume equal groundwater extraction from both the Aquifers 1 and 2, significant changes in vertical gradient would not be expected. In fact, the investigation indicates a slight downward vertical gradient from Aquifer 1 (Fair Oaks Formation) to Aquifer 2 (Mehrten Formation) for both the baseline and the 3,000 AF/year project groundwater extraction scenario.

The RL/ECWD groundwater investigation did not include using the model to analyze for the potential of water with high TDS upwelling from pre-Mehrten formations. The potential for upwelling of brackish (high TDS) water from pre-Mehrten formations was not identified as an issue of concern in *Bulletin 118-3* (DWR, 1974). In addition, as shown in Appendix D (MWH, 2001), Aquifer 3 is not present in the IGSM in this portion of Sacramento County, so IGSM modeling for the previous regional planning efforts described above has not addressed this issue.

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Finally, the proposed new wells are similar to most large volume municipal water supply wells in this portion of Sacramento County (which are typically screened in both the Mehrten Formation and overlying formations) and upwelling of brackish water has not been a historical concern. A recent poll of Northridge Water District, Arcade Water District and Rio Linda/Elverta Community Water District indicates that brackish water upwelling is not a problem in their water wells. On June 6, 2001 the engineer for Northridge Water District indicated that NWD has not experienced upwelling problems in the approximately 30 water wells it currently operates. On June 7, 2001, the outside engineer for Arcade Water District, who has 20 years experience with wells in the Sacramento Basin, reported that his clients penetrate the Mehrten Formation "all the time" without brackish water upwelling. On June 7, 2001, the individual responsible for well operations for Rio Linda/Elverta Community Water District who is familiar with all RLECWD wells drilled since 1948, reported that RLECWD has not experienced upwelling problems in the 11 wells it operates with screens that range in depth from 300 to 600 feet.

ISSUE: *In their letter dated February 28, 2001, the Rio Linda/Elverta Community Water District stated that groundwater depths in neighboring wells may be affected by the operation of new wells to serve the project. The District also stated that "ongoing investigations into toxic groundwater pollution under McClellan AFB may result in future discovery that impacts from additional pumping currently identified as less-than-significant were not properly categorized." In the AFC, the applicant claims that "groundwater quality will not be affected by the site development or operation" (AFC, p. 5.4-9) and provided estimates for the drawdown of neighboring wells resulting from the operation of the new wells.*

Data Request #87: Please provide staff with the analysis conducted by the applicant to determine that groundwater pumping to serve the RLEPP would not affect the McClellan Air Force contamination plume or have an adverse affect on groundwater quality. Provide all appropriate documentation needed to evaluate the technical basis of your conclusions, including computer model programs, assumptions, copies of references, input and output files, figures, and any other appropriate documentation. Discuss how these parameters were developed, and why they were selected.

Response:

INTRODUCTION

Please refer to Response to Data Request #86 for introduction.

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POTENTIAL EFFECT ON McCLELLAN AFB CONTAMINATION

The work conducted as part of the RL/ECWD groundwater impact investigation (MWH, 2001) related to the McClellan AFB contamination plume provides an approximation of change in velocity and direction at the area of the current McClellan AFB groundwater contamination. The investigation found that the potential change in velocity and direction in the upper aquifer (Aquifer 1) relative to existing conditions is a result of the baseline model conditions and not the project conditions. This change is assumed to occur from both existing groundwater extraction and new future groundwater extraction represented in the baseline model conditions. Since monitoring results indicate that the groundwater basin is still in a dynamic state and has not reached equilibrium, a portion of the observed change from existing conditions to baseline conditions can be attributed to existing groundwater extraction. There is little to no potential incremental change in velocity or direction as a result of the 3,000 acre-feet per year project groundwater extraction added to the baseline condition. No model run was developed under the RL/ECWD work to look at the incremental effects of the project groundwater extraction using existing conditions as a baseline.

MODEL LIMITATIONS

It should be noted that the IGSM is not a contaminant transport model. However, the IGSM can be used to obtain general contaminant migration directions and rates to the extent that contaminants are transported by bulk advective flow. For the RL/ECWD investigation, the flow direction and velocity of contaminant plumes were estimated based on the change in gradient or slope of the groundwater contours at a specified point relative to existing (Fall 1997) and baseline model conditions.

Because only groundwater flow modeling (not contaminant transport modeling) was conducted, the physical and chemical properties of the contaminants were not used in the model. The more conservative approach of using the groundwater flow velocity was used instead, which is recommended by the California Department of Health Services in the Drinking Water Source Assessment Program. The physical and chemical properties of the contaminants would retard their movement and/or lead to breakdown of the contaminants, thus resulting in slower migration rates than the advective flow velocities estimated by the model. The specific physical and chemical properties of the contaminants found in the groundwater at McClellan AFB were therefore not considered or necessary in the regional groundwater investigation conducted for RL/ECWD.

The IGSM model used for the RL/ECWD groundwater investigation has the same limitations that any regional groundwater flow model would have for estimating groundwater flow velocities and directions. In particular, the regional model does not simulate potential preferential flow paths resulting from local coarse-grained permeable stream channels in the

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subsurface that would affect local flow directions and velocities of both groundwater flow and associated contamination.

Future remedial efforts at McClellan AFB cannot be anticipated at this time and have therefore not been modeled in the RL/ECWD groundwater investigation, but such efforts by the Air Force to maintain hydraulic capture of the plume should be expected and obviate the need for contaminant transport modeling. The Air Force is currently conducting both on- and off-base remediation, and is required to contain the plume to prevent further migration of the contaminant plume and threat to human health through water supply wells.

Appropriate documentation for the RL/ECWD investigation (MWH, 2001) that may be requested through the RL/ECWD includes the following:

- North American River and Sacramento County Combined IGSM computer model program
- IGSM input files (Baseline and 3,000 Acre-ft. Project Scenario (Model Run 3))
- IGSM output files [Baseline and 3,000 Acre-ft. Project Scenario (Model Run 3)]
- The primary basis for the North American River IGSM, as described above, is Bulletin 118-3 (DWR, 1974, see Attachment #85C).

Based on Applicant's understanding that these documents are available from RL/ECWD, the Objections to Portions of Data Request #87, filed previously, is hereby withdrawn.

Data Request #88: Please provide copies of reports on the physical and chemical characteristics of the contamination plume that were used in the modeling and or analysis.

Response: The reports on the physical and chemical characteristics of the McClellan AFB contaminant plume are provided in the Response to Data Request # 80 above, including internet links to sites where copies of the referenced reports can be printed.

Data Request #89: Please provide staff with the analysis conducted by the applicant to estimate the drawdown in neighboring wells that would result from the operation of the new wells for the RLEPP. Provide all appropriate documentation needed to evaluate the technical basis of your conclusions, including calculations, computer model programs, assumptions, copies of references, parameters, input and output files, and figures. Discuss how these parameters were developed, and why they were selected.

Response: As per the Data Request, this response contains a description of the site-specific analysis of local impacts to neighboring wells due to groundwater extraction from a new well

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for the RLEPP. The pumping test data (RLECWD Well #2 test) used to derive the local estimated transmissivity is attached.

When pumping occurs from an aquifer, a concentrated localized cone of depression is formed around the well. The shape and depth of the localized cone of depression depends on many factors, including but not limited to, 1) the rate of pumping, 2) the presence of nearby streams or wells, 3) how much water is stored in the aquifer, 4) how easily water can move through the aquifer, and 4) whether the aquifer is confined or unconfined. Conceptually, there are two primary water bearing geologic formations underlying the project, the Fair Oaks Formation (upper unconfined aquifer) and the Merhten Formation (lower semi-confined aquifer). The actual stratigraphy of water bearing strata throughout each of the formations changes over their aerial extent. Well drilling logs indicate that in the project area the Fair Oaks Formation (upper aquifer) is generally comprised of a series of clay, sand, and gravel lenses that extend to approximately 300 to 400 feet below ground level. The underlying Merhten Formation (lower aquifer) is generally comprised of finer sand and clay lenses and extends beyond 1,000 feet below ground level. Conceptually, the multiple clay lenses that are present near the formation boundaries are modeled as an aquiclude that separates the semiconfined lower aquifer from the overlying unconfined upper aquifer.

Over a day, pumping in the unconfined upper aquifer de-waters the aquifer around the well until pumping stops; the aquifer then typically recharges slowly back to its pre-pumped condition. A confined or semi-confined aquifer behaves differently since the water is under pressure from a recharge source. Instead of de-watering the aquifer, only a change in confining pressure occurs as a result of pumping. As pumping occurs, the pressure or piezometric surface (the elevation of water in a well completed only in the confined aquifer) drops down more dramatically and deeper than the unconfined aquifer; however, the recovery to pre-pumping conditions is much faster and the loss in aquifer storage is spread over a larger area during the cycle period.

A project well pumping from only the upper aquifer will have the most significant effect on nearby private wells since most private domestic wells in the Sacramento and Placer County areas are completed in the upper unconfined aquifer where the quality of water is better. The lower confined aquifer is generally preferred for high production municipal and industrial wells since the localized cone of the piezometric surface from an underlying confined aquifer has less effect on the upper aquifer wells. In addition, as the confined aquifer piezometric surface is drawn down below the unconfined aquifer water surface, the differential induces a slight downward migration of upper aquifer water through the semi-confining layer to the lower aquifer reducing the chance of moving lesser quality water into the upper aquifer.

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Actual aquifer testing provides the best source of data to analyze localized impacts resulting from well extractions. The Integrated Groundwater Surface Water Model (IGSM) used in the preliminary groundwater investigation completed for RL/ECWD regionalizes aquifer data to account for heterogeneity of soil types over a larger area and is not recommended for use in this application. Furthermore, the model focuses on persistent regional changes in the aquifer rather than changes in the local flow field that result from short-term individual well extractions. As a result, an analytical solution that uses site-specific local conditions was used to estimate the project effect on neighboring wells.

The Theis non-equilibrium well equation is typically used to predict drawdown at a given distance from a pumping well relative to the static water level in response to pumping when the aquifer properties are known (Driscoll, 1986, Groundwater and Wells). The solution to the equation assumes ideal aquifer conditions that are never attained in nature, namely, an aquifer that is 1) horizontal, 2) confined between impermeable formations on top and bottom, 3) infinite in horizontal extent, 4) of constant thickness, and 5) homogeneous and isotropic. Furthermore, for an ideal system, it assumes 1) a single pumping well, 2) a constant pumping rate, 3) infinitely small well diameter, 4) well penetration of the complete aquifer, and 5) uniform hydraulic head prior to pumping (Freeze and Cherry, 1979, Groundwater).

In the real world, aquifers are usually heterogeneous and anisotropic, vary in thickness, and not infinite in extent (Freeze and Cherry, 1979). In the real world, aquifers are formed by complex geologic processes, which is certainly the case for the alluvial aquifers beneath Sacramento County. The predictions that can be carried out with analytical solutions such as the Theis equation must be viewed only as best estimates (Freeze and Cherry, 1979).

As described above, the maximum drawdown can be expected in the unconfined aquifer, so the Theis equation was used to estimate the drawdown in an existing neighboring well as a result of the new proposed wells. As shown in Figure 52-8 (Attachment A Responses to Data Adequacy Requests, 5/15/01), an estimated drawdown of 5 feet below static water levels occurs at a radius of approximately 800 feet from the proposed new wells. The Theis equation and the parameters are as follows:

$$s = 114.6 Q W(u) / T$$

Where,

s = drawdown (ft.) in the vicinity of a pumping well

Q = pumping rate, in gallons per minute (gpm)

T = transmissivity

W(u) = the "well function of u" (an exponential integral)

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In the $W(u)$ function, u is equal to:

$$u = 1.87 r^2 S / Tt$$

where,

r = distance (ft.) from the well to the point the drawdown is measured

S = coefficient of storage (dimensionless)

T = coefficient of transmissivity (gpm)

t = time since pumping started in days

The assumed values and rationale for the use of the individual parameters in this estimate of drawdown in neighboring wells is provided below. A comparison of these local parameters to the regional IGSM parameters is provided in the Response to Data Request # 90:

Discharge rate (Q): As described in Attachment A Responses to Data Adequacy Requests (5/15/01), 1,500 gpm is the anticipated capacity of the new RLECWD wells, which is conservative in that only 912 gpm per well from 2 wells would be required to satisfy the project demands. The 1,500 gpm is a typical flow rate for wells in the RLECWD and North Sacramento County. The higher number was used to be conservative and to assume that the well was operated as part of the RLECWD water system delivering water to retail customers including the RLEPP.

Transmissivity: As described in the Responses to Data Adequacy Requests (Attachment A, 5/15/01), an assumed transmissivity of 56,000 gpd/ft was used. This transmissivity was based on a short-term constant rate pumping test data from Pete Fuller Construction (December, 1993, attached) analyzed using the Cooper – Jacob method in Aquifer Test, commercially available software by Waterloo Hydrogeologic. The reliability of the pumping test data cannot be independently verified, and the test period was a relatively short three hours with no observation wells. A longer term test with observation wells would be necessary for a more accurate estimate of aquifer transmissivity. However, this value is consistent with typical estimates for the Fair Oaks and upper Mehrten formations and is reasonably similar (within a factor of 2) to the 102,102 gpd/ft value in the IGSM for the upper aquifer. The value is conservative in that using a higher transmissivity value of 102,000 gpm/ft would decrease the radius of the five-foot drawdown to approximately 600 feet.

$W(u)$: The well function is an exponential integral, and the values corresponding to values of u for the Theis nonequilibrium equation are provided in Driscoll, 1986 (Appendix 9.E.)

Storage Coefficient: The assumed storage coefficient of 0.15 (unitless) is a typical value for the specific yield of an unconfined sand and gravel aquifer, which typically ranges from 0.1 to

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0.3 (Freeze and Cherry, 1979). A storage coefficient from the relatively short 3-hour pumping test would not be representative because no observations wells were available and because it would not reflect the effect of delayed yield in the unconfined aquifer. According to Freeze and Cherry (1979), the use of the specific yield and the Theis equation gives very good predicted drawdowns for unconfined aquifers, as long as the drawdown is small compared to the total saturated thickness of the aquifer. Since the drawdown is only a few feet relative to a saturated thickness of hundreds of feet, this assumption is considered valid. The regional IGSM estimate for the storage coefficient is 0.08 (within a factor of two) for the upper aquifer, indicating a regional average of specific yield, including clay lenses that are interspersed throughout the aquifer.

Radius: The radial distance from the pumping well where the aquifer drawdown is calculated.

Time: As described in the Responses to Data Adequacy Requests (Attachment A, 5/15/01), a value of 30 days was used, which is very conservative given that wells typically aren't pumped for over 18 hours without being allowed to cycle off and recover.

It should be noted that the Theis nonequilibrium well equation is based on a number of simplifying assumptions (described in Driscoll, 1986, p.218), including uniformity of the aquifer, full penetration of the aquifer by the pumping well, and 100% well efficiency. The drill log for well RLECWD #2 indicates a thick clay is present just below the bottom of the well (at 550 to 596 ft.), indicating that the assumed well depth fully penetrates the upper aquifer. However, all assumptions and estimates are approximate and actual conditions in nature never match the simplifying assumptions. Only monitoring of groundwater levels in observation wells in response to actual pumping at a specific site can verify the above estimates.

REFERENCES:

Driscoll, F. G., 1986. Groundwater and Wells. Published by Johnson Division, St. Paul Minnesota.

Freeze, R. A., and Cherry, J. A., 1986. Groundwater. Prentice-Hall, Inc., Englewood Cliffs, NJ.

Data Request #90: Please provide a listing of the common parameters used in the analysis of project impacts on the McClellan Air Force contamination plume and on drawdown in wells located in the vicinity of the proposed project wells. If there are any differences in the common hydrologic parameters used in these two analyses, please explain why.

Response: The discussion and data provided in Response to Data Request #87 provides the common parameters for the IGSM modeling of the potential project impacts on the McClellan AFB contaminant plume. The Response to Data Request #89 above lists the common parameters used in the analysis of the drawdown in neighboring wells using the Theis

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equation and discusses them relative to regional IGSM parameters. It should be noted that local site-specific parameter estimates from a single pumping test should not be expected to match the regional averaged estimates of the IGSM. The table below summarizes the parameters with a summary of any differences.

Parameter	Neighboring Well Drawdown Analysis	IGSM Modeling	Differences
Transmissivity	56,000 gpd/ft	102,000 gpd/ft	Neighboring well analysis based on site-specific pumping test data (see #89) versus regional estimate. Estimates are within a factor of two
Storage Coefficient	0.15	0.08 (Upper Unconfined Aquifer)	IGSM represents an average of the regional heterogeneity of soils. Neighboring well analysis assumes well location targets sand and gravel lenses. Estimates are within a factor of two.
Well Flow Rate Discharge	1500 gpm (one well)	1,000, 3,000, 5,000 acre-ft/yr. (four well total)	1,500 gpm is typical yield for County wells (see # 89); total annual project demand would be approximately 2945 acre-ft/yr. (1825 gpm/ two wells = 912 gpm). Neighboring well analysis is therefore within a factor of two and conservative.

Data Request #91: Please provide an analysis of the change, over the life of the project, in the quantities of project's groundwater supply that will come from aquifer storage and from induced groundwater recharge from the Sacramento River.

Response: Using a proposed project extraction rate of 3,000 acre-feet per year of pumping, the model results indicate a 50-year period is needed to reach a new balance.¹ Approximately 42,000 acre-feet out of the 150,000 acre-feet extracted over a 50-year period is shown to come from aquifer storage. The difference between the total pumped (150,000 acre-feet) and the total change in storage (42,000 acre-feet) is the amount of the groundwater extracted for the project that can be expected to be offset by induced groundwater recharge (approximately 108,000 acre-feet). (Note: Given a 30-year project life, the amount of water removed from storage during the first 30 years of the 50-year period is approximately 36,000 acre-feet.)

¹ The total amount of water lost from aquifer storage as a result of the new well is the volume needed to induce an amount of recharge from the rivers equal to the pumping rate of the well. This assumes that the induced recharge is sufficient to balance the groundwater system at the higher extraction rate (i.e. no overdraft). The period of time over which this balance occurs is typically measured in decades.